

20416/c/1

28

20/3

Mary Hollinson
1809

DICKSON, R. W.

76834

A
COMPLETE DICTIONARY
OF
PRACTICAL GARDENING:

COMPREHENDING ALL THE
MODERN IMPROVEMENTS IN THE ART;
WHETHER IN THE
RAISING OF THE VARIOUS ESCULENT VEGETABLES,
OR IN THE
Forcing and Managing of different Sorts of Fruits and Plants,
AND THAT OF
LAYING OUT, ORNAMENTING, AND PLANTING,
GARDENS AND PLEASURE GROUNDS:

WITH
CORRECT ENGRAVINGS

OF THE NECESSARY APPARATUS, IN BUILDINGS AND OTHER CONTRIVANCES, AS WELL AS OF THE
MORE RARE AND CURIOUS PLANTS CULTIVATED FOR ORNAMENT OR VARIETY:

FROM
Original Drawings by Sydenham Edwards.

BY ALEXANDER McDONALD, GARDENER.

IN TWO VOLUMES.—VOL. I.

London:

PRINTED FOR GEORGE KEARSLEY, 46, FLEET-STREET,

BY R. TAYLOR AND CO. 38, SHOE-LANE.

1807.

COMPLETE DICTIONARY
PRACTICAL GARDENING

MODERN IMPROVEMENTS IN THE ART



RAISING OF THE VARIOUS SELECT VEGETABLES

Having and Managing of the several Sorts of Trees and Plants

LAYING OUT ORNAMENTS AND PLANTING
GARDENS AND PLEASURE GROUNDS

WITH
CORRECT ENGRAVINGS
OF THE SEVERAL PLANTS IN BUILDINGS AND THE SEVERAL SORTS OF TREES
AND SHRUBS AND THE SEVERAL SORTS OF FRUIT TREES AND SHRUBS

Original Edition by William Cloome

By ALEXANDER McDONALD, Gardener

IN TWO VOLUMES—VOL. I

London:

Printed for GEORGE KNEELAND, 48, Fleet Street.

By J. BAYNE AND CO. 25, Abchurch Lane.

PREFACE.

WHILE almost every other department of useful science has been arranged and brought into a more accessible and convenient form, in the shape of a Dictionary, that of GARDENING has remained nearly without assistance in this respect. The present is, however, an attempt to render so important and beneficial a branch of knowledge more easy and comprehensible, by better and more correct explanations of the various objects which it embraces; by more full and accurate descriptions of the different plants and processes; and by more clear and distinct delineations of the various modes of culture and management by which they may be raised, preserved, and brought to perfection, in the easiest and most expeditious manner. The execution of this undertaking, from the difficult and imperfect state of the art, has been attended with considerable labour and trouble; but the author hopes, from the practical knowledge which he possesses, and the various sources of information of which he has been enabled to avail himself, that it has been performed in a manner that will not be found less useful in directing the practical Gardener, than those who are not so conversant with the nature of the subject, as bringing them more fully acquainted with the various methods

that have been commonly employed, as well as those which have been suggested by modern experience.

In addition to these advantages, the Work also affords others that are probably not of less utility to the horticulturist ; those of having accurate REPRESENTATIONS of many of the most rare and curious plants that are cultivated in shrubberies, or other parts of pleasure-grounds, and in green-houses and stoves, engraved from original drawings of the plants, by the best artists, as well as of all the different improved buildings and other contrivances employed in the raising, forcing, and preserving the various sorts of fine fruits and tender vegetables, taken from those made use of in actual practice with the greatest œconomy and success.

It is therefore hoped that the work will be found deserving of attention, as furnishing a full and complete view of the most approved methods of HORTICULTURE, whether in the management of the KITCHEN-GARDEN, or in the art of FORCING the finer vegetable productions.

GENERAL DICTIONARY

OF

PRACTICAL GARDENING, &c.

A B R

ABELE, a general name applied to the *White Poplar Tree*. See *POPULUS*.

ABIES, the *Fir Tree*. See *PINUS*.

ABROMA, a genus comprehending a tree of the exotic kind known in the East Indies, and cultivated occasionally in the stove in this country.

It belongs to the class and order *Polyadelphia Dodecandria*, and ranks in the natural order of *Columniferae*.

The characters of which are : that the calyx is a five-leaved perianthium, having lanceolate, acute, spreading, permanent leaflets: the corolla consists of five petals, larger than the calyx, with obovate, arched, concave, and erect claws, which are hairy at the ends, and inserted at the base into the nectary; having oval, obtuse, spreading ciliate borders, which are contracted at the base into very short, ciliate, recurved, little claws, on which the principal ones are placed: the nectary is short, small, and pitcher-shaped; being divided into five segments, which are obcordate, hairy, and erect, being recurved, arched, and alternate with the claws of the petals: the stamina are five filaments, membranaceous, and very small, growing on the nectary between the emarginate trifid segments, and topped with three twin kidney-shaped antheræ on each filament: the pistillum is a subcylindrical germ, having five subulate approximating styles crowned by acute stigmas: the pericarpium is an ovate, membranaceous, veined capsule, five-winged, five-beaked, and five-celled, gaping at the top into five parts between the beaks, having the partitions folded: the seeds are many and subovate, contained within an ob-

A B R

lique membranaceous aril, and fixed in a double row to the central edge of the partitions, which is thickened and bearded longitudinally, but without any receptacle for the seeds.

The species are : 1. *A. angusta*, Maple-leaved Abroma; 2. *A. Wheeleri*, Wheeler's Abroma; the first of which only has been introduced and cultivated here.

It rises to the state of a tree, having generally a straight trunk, and branches that are adorned with some ovate, spear-shaped, acuminate leaves; and others which are angular, as those of the first year, with five or seven lobes which are acute, the anterior ones being most produced, all veined, and alternate, of a green colour on both the upper and under sides, but paler on the latter. Every part of the plant is covered by stiff, shining, decumbent bristles, of a whitish cast, scarcely observable by the naked eye, but readily separating, and adhering to the fingers without injury. The peduncles are mostly bifid, bearing two flowers of a dark purple colour, which come out on the ends of these bifid footstalks, nodding elegantly downwards, but with little or no smell; continuing to appear from June to October, and perfecting the fruit about the beginning of the latter month.

This plant grows naturally in New South Wales and the Philippine Islands, and, when cut, yields a kind of gum. It was introduced into this country about the year 1779.

The latter is a plant of the shrub kind, a native of the East Indies, having a brownish-coloured bark, and the extreme branches covered by a woolly substance.

B

Culture.—The propagation of the first, or tree kind, is by cuttings made in the spring, and planted out in pots in order to be plunged into a hot-bed, where, after being well rooted, they should be transplanted into single pots and placed in a bark-bed in the stove, where they must constantly be kept, as they require a pretty strong heat and much water. The seeds do not easily become ripe in this climate, seldom indeed arriving at a state proper for vegetating without great attention. The second sort is not yet much known or cultivated.

ABROTANUM. See ARTEMISIA.

ABRUS, *Wild Liquorice*, a genus comprehending a plant of the perennial shrubby kind, sometimes cultivated in the stove in this country.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Leguminosæ*.

The characters are: that the calyx is a one-leaved, bell-shaped, obscurely four-lobed perianthium: the teeth blunt, and the upper the broadest: the corolla papilionaceous, having the banner roundish, entire, ascending, and flattened at the sides, but longer than the wings and keel: the wings oblong and blunt; and the keel oblong, sickle-shaped, gibbous, and longer than the wings: the stamina nine filaments united into a sheath, cloven above, free at the end, unequal, and rising; with oblong erect antheræ: the pistillum a cylindrical hairy germ; with the style subulate and rising, but shorter than the stamina: the stigma in the form of a head, but small: the pericarpium a rhomblike, compressed, acuminate legume, coriaceous, bivalved, four- or five-celled, with a little subulate deflex claw; each cell containing a subglobose seed.

There is only one species; the *A. precatorius*, Jamaica Wild Liquorice.

This has a slender, shrubby, twining, branchy stalk, rising when supported to eight or ten feet in height, adorned with pinnate leaves which end abruptly, and having from twelve to sixteen pairs of small, smooth, oblong, blunt folioles, or leaflets, set close together. The flowers are of a pale purple colour, and come out in short spikes or bunches from the sides of the stalks, having the shape of the kidney bean; and are succeeded by short pods, containing in each three or four hard seeds of a bright scarlet colour, with a black speck or eye on the sides on which they are fastened to the pod.

Professor T. Martyn, on the authority of Gærtner, remarks, that the legume or pod is occasionally found of an oblong form, containing six seeds scarce apparently divided by a membrane, which often disappears as the seeds become ripe. The small leaflets have the taste of liquorice, and are used for the same purposes: hence the plant seems to have obtained its name.

There are two varieties of this plant—one that has a white, and another a yellow, seed: but they do not differ from the former either in leaf or stalk. It is said to grow naturally in both the East and West Indies, as well as in Guinea and Egypt.

Culture.—The propagation of this plant is by seeds; which should be sown on a good hot-bed in the spring, being previously soaked three or four days in water, in order to promote their vegetating power. When the plants are come up about two inches in height, they should each be transplanted out into a separate pot filled with light earth, and then plunged into a bark-bed in the stove, keeping them well shaded from the sun until they have struck or taken fresh root; in which situation they must be constantly kept: after this they are to be treated as other tender plants. They mostly flower in the second year, and occasionally ripen their seeds even in this climate.

ABSINTHIUM. See ARTEMISIA.

ACACIA. See MIMOSA.

ACACIA, *False and Scarlet*. See ROBINIA.

ACACIA, *Three-thorned*. See GLEDITSIA.

ACANTHUS, *Bear's Breech*, a genus which comprehends several hardy herbaceous plants of the perennial flowering kind, which are in use for the purpose of ornament in pleasure-grounds, &c. and also one of the evergreen shrubby sort for the stove.

It is of the class and order *Didynamia Angiosperma*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a perianthium, with leaflets in three alternate pairs, unequal, and permanent: the corolla single-petalled and unequal, having a short tube closed with a beard; no upper lip; very large under lip, which is flat, straight, very broad, three-lobed, obtuse, and of the length of the upper lip of the calyx: the stamina have four filaments, subulate, shorter than the corolla, the two upper rather longer, recurved and incurved at the top: the antheræ are oblong, compressed, obtuse, the lateral ones parallel, and villous before: the pistillum has a conical germ, a filiform style of the length of the stamina, and two acute lateral stigmas: the pericarpium is a subovate pointed capsule, two-celled and two-valved, with a contrary partition, alternate claws, curved and fastened to the partition: the seed is ovate, gibbous and single, but sometimes double.

The species most commonly cultivated are: 1. *A. mollis*, Smooth Acanthus; 2. *A. spinosus*, Prickly Acanthus; 3. *A. ilicifolius*, Holly-leaved Shrubby Acanthus.

The first, or Smooth Acanthus, according to Miller, has the stem from two to three feet in height. The leaves are oblong, smooth on both

sides and shining, from a span to a foot in length, divided deeply into opposite ovate lobes, which are bluntly toothed and finely ciliate about the edges, placed on roundish petioles, with a flat chanuel running along the upper surface. Both the leaves and flower-stems rise directly from the root: the former, by spreading closely upon the ground in circular clusters, produce a good effect. But though the leaves are said to be smooth, they are not without white bristles on both sides, especially along the nerves. The flowers are white, and come out from about the middle to the top of the stalk. They make their appearance in July or August, continuing in blow a month or six weeks, and then produce seed.

There is a variety of this plant in which the leaves are larger and less sinuated, the upper side shining.

The second sort, or Prickly *Acanthus*, has the leaves deeply jagged in very regular order; each segment is terminated by a sharp spine, as are also the petioles and the calyx of the flowers, so that the plant is troublesome to handle. In both these species the leaves and stalks are annual.

The Holly-leaved *Acanthus* is an evergreen shrub, which rises about four feet in height, dividing into many branches; the leaves being similar to those of the common holly both in size and shape, and also armed with spines in the same manner. The flowers come out ringly in an upright raceme at the end of the stalk, are white, and shaped like those of the Common *Acanthus*, but smaller.

The two first are thick, fleshy, fibrous-rooted plants, which spread considerably, and penetrate the earth to a great depth. They are found in their native state in Spain, Italy, and Portugal; but grow without difficulty in the open ground in this climate.

The last is a very tender plant, which in this climate requires the constant heat of the stove to preserve it. It is a native of South America, and also of both the East and West Indies. It is retained in hot-houses for the purpose of variety.

Culture.—Both the Smooth and Prickly *Acanthus* are found to succeed in any common soil without much attention to the nature of the exposure, and are said by Miller to be lasting plants, which may be propagated either by seeds or the parting of the roots. If by the former method, the seed should be sown in a light dry soil towards the end of March, either in slight drills or on the plain surface, and immediately raked in. When the season proves favourable, the plants appear in May, and all the after-culture they require is to keep them clean from weeds, and, where they stand too close, to thin them out, so as to leave them about six inches apart; which is room sufficient for them to grow in until

the autumn, when they should be transplanted into situations where they are designed to remain. The first, as being the most tender, is advised to be planted in a warm border near a wall, and which, as the plants do not multiply so fast by their roots, do not require more room than about three feet; but the second, as it spreads its roots to a great distance, should have more than twice that space. From this last sort being hardy, it may be proper to be planted between shrubs to fill up vacant spaces; where it will grow without difficulty, provided the ground be light and not over wet; and when in flower will thus make an agreeable variety.

When they are propagated by their roots, the operation may be performed either in spring or autumn: but the former should only be removed in the spring; for, if transplanted in the autumn, and the following winter should prove cold, it will run the hazard of being destroyed. The roots in these cases should not be parted too small, and the plants be at once placed out where they are to remain. See **PARTING OF ROOTS**. As these plants take very deep root, when planted in wet ground, the roots are liable to rot in the winter. They have frequently been traced more than four feet: they should not therefore be wholly removed after they have been growing long in a place; but the side shoots be annually taken off, otherwise they will be apt to spread so far as to overpower the neighbouring plants or shrubs. The remaining culture is only that of affording the flowering stems due support when it becomes requisite, and carefully clearing away the decayed stalks in the autumn.

When these plants are once well established in a piece of ground, they are observed by Miller to be eradicated with great difficulty.

Both the Smooth and Prickly *Acanthus* are mostly kept in the nurseries for the purpose of sale.

The Shrubby species of *Acanthus* may be propagated with the greatest certainty by sowing seed that has been procured from abroad, in pots; to be plunged in a bark-bed in the stove until the plants are raised, when they are to be managed in the same manner as other hot-house plants. Layers and cuttings likewise sometimes succeed, when planted in pots and placed in the same situations.

ACER, the *Maple*, a genus including a great variety of hardy deciduous trees, useful both for the purposes of timber, and those of ornament in pleasure-grounds, and other situations.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order *Trihilatæ*.

The characters of which are: that it has hermaphrodite and male flowers on the same tree: the

hermaphrodite calyx is a one-leafed, five-cleft, acute, coloured, flat and entire at the base, permanent perianthium: the corolla has five petals, ovate, broader outward, obtuse, scarcely larger than the calyx, and spreading: the stamina consist of eight or ten subulate short filaments: the antheræ are simple, and the pollen cruciform: the pistillum has a compressed germ, immersed in a convex, perforated, large receptacle: the style is filiform, and daily progressive: the stigmas are two or three, pointed, slender and reflex: the pericarpium is composed of as many capsules as stigmas, with one seed in each, coalescent at the base, roundish, compressed, and each terminated by a very large membranous wing: the seeds are solitary and roundish: the male flowers are the same with the hermaphrodites, except that they have neither germ nor style, but only a bifid stigma. On the first unfolding of the flower, the stigma only appears, and a few days afterwards the style. The hermaphrodite flowers in the same umbel are often of two kinds: the lower ones feminine hermaphrodites, of which the antheræ do not burst, but the pistillum grows into a fruit; the upper ones masculine hermaphrodites, of which the antheræ scatter their dust, and the pistils do not grow, but fall off.

The species are numerous: but those which have been introduced and chiefly cultivated in this country, either for the purposes of timber or ornament in pleasure grounds, are, 1. *A. pseudoplatanus*, Greater Maple or Sycamore; 2. *A. campestre*, Common or Smaller Maple; 3. *A. Negundo*, Ash-leaved Virginia Maple; 4. *A. Monspessulanum*, Montpelier Maple; 5. *A. Platanoides*, Planetree-like Norway Maple; 6. *A. rubrum*, Scarlet-flowering Maple; 7. *A. saccharinum*, Sugar Maple; 8. *A. Tartaricum*, Tartarian Maple; 9. *A. Opalus*, Italian Maple; 10. *A. Pensylvanicum*, Pennsylvanian Mountain Maple; 11. *A. Creticum*, Cretan Maple.

The first, or Great Maple, has the leaves divided towards the base into three large and two small lobes, the edges being unequally serrated, the racemes pubescent and hanging down, the flowers of a yellowish green colour, and the wings of the capsules erect. It grows to a great height, often with a clear stem or bole, and spreading top. It comes early into leaf, as about the middle of April; and these at first have a pleasing green colour, but, from their exuding a clammy juice, are liable to be soon eaten by insects; which lessens its value for purposes of ornament. The bunches of flowers are in full bloom about a fortnight after the first appearance of the leaves, but from their bad colour produce little ornamental effect.

This tree was formerly much employed in planting walks, avenues, &c. but has lately given

place to others of the more ornamental kind. It is probable, however, that near the sea-coast it may be planted with advantage, either alone, or for the purpose of sheltering other trees, as it is known to withstand the attacks of the sea air with peculiar hardiness. On being wounded, it exudes a great quantity of liquor, of which good wine is made. There are two varieties of the Great Maple or Sycamore:—one with broad leaves and large keys—the other with variegated leaves. The latter, when blended in large plantations, afford a pleasing variety. This tree is frequently known by the names of Sycamore, Mock Plane, and Plane Tree.

In the second, or Common Maple, the bark is rough and deeply fissured, the leaves growing in pairs on long petioles; being divided about half way down into three lobes; the side ones subdivided into two smaller ones, and the middle one into three which are obtuse. The flowers are greenish, hanging in thin, loose, short clusters at the extremities of the branches. The peduncles, when broken off while young, are lactescent. The receptacle of the flower is spongy, and divided into eight rays, a stamen being placed between each. This is a tree of much humbler growth than the former, and by no means so ornamental: it may however be admitted in extensive plantations.

The third sort, or Ash-leaved Virginia Maple, is a very strong-shooting tree of quick growth. It is well calculated, on account of its pale green leaves, which vary in form from those of the other species, being composed of distinct lobes, to constitute a pleasing variety in plantations; but they fall soon in the autumn. It should be made use of in situations that are not much exposed to the winds, as it is said to be apt to be split by them. The wood is soft and brittle.

The Montpelier Maple is a tree that grows about twenty feet in height. The leaves resemble those of the Common Maple, but are of thicker substance and not so large, have a shining green colour, and continue their verdure late in the autumn; which renders the tree more valuable. This sort is not common at present in this country. The blow of the flowers is soon over, and has not much beauty. It is occasionally succeeded by ripe seed. This tree is common in the southern parts of France and in Italy.

The Norway Maple rises to a large size. The leaves are smooth, and of a shining green colour, fully as large as those of the first kind, and, from the tree abounding in a sharp juice of a milky appearance, seldom eaten or much injured by insects. They are more ornamental than those of the Sycamore; the trees having in the spring, when the flowers are in full blow, from their fine yellow colour, a most beautiful effect. It is

met with in the mountainous parts of most of the northern states of Europe.

There are two varieties of the Norway Maple;—one with variegated or striped leaves, and the other with cut leaves.

The Scarlet-flowering Maple is a dioecious tree, the leaves of which are composed each of five sharp-pointed lobes, which are slightly indented or serrated: they are smooth, of a pale green on their upper surface, and sea-green colour underneath; and they grow on long, simple, taper, reddish footstalks. The flowers come out in clusters from the sides of the branches before the leaves, and have only six stamina. They appear in April, and the seeds ripen in June.

There are two varieties of it;—the Virginian Scarlet-flowering Maple, and Sir Charles Wager's Maple. Both of them are propagated for the sake of the flowers, which are of a scarlet colour. The sort called Sir Charles Wager's produces larger clusters of flowers than the other; on which account it is most in esteem.

The Sugar Maple is a large-growing tree, sometimes arriving at the height of forty feet, and has broad thin leaves divided into five principal parts, which are again indented or cut at the edges into several acute segments. Their surface is smooth, of a light green colour, whitish underneath; and grow on pretty long footstalks. The flowers come out in the spring, about the time of the Norway Maple; and are succeeded by seed, which sometimes ripens here. In America, the inhabitants tap this tree in the spring, and boil the liquor, which affords an useful sugar. The Sycamore, the Ash-leaved and the Norway Maples also abound with a saccharine juice, from which sugar might probably be prepared with advantage.

The Tartarian Maple grows to upwards of twenty feet in height. The leaves are heart-shaped, undivided, and their edges unequally serrated. The flowers come out from the wings of the leaves in bunches of a longish form, appearing early in the spring, and are occasionally succeeded by ripe seed in this climate. It is a native of the southern parts of Russia.

The Italian Maple has a trunk ten feet in height, straight, branching, and covered with a gray bark. The branches are flexible. The leaves are middle-sized, thin, three- or five-lobed, toothed, and rounded. The flowers are in a very loose pendent raceme; on peduncles very long, branching and bending: they are larger than those of the other sorts, composed of five lanceolate petals, yellowish and veined. The calyx is very small, falling a long time before the corolla. The stamina are eight in number, and twice as long as the corolla; the wings of the seed not adhering to the

sides of the capsule, as in the other species, but placed at the top, and only a little separated from each other. It is common in many parts of Italy. It is a lofty tree, and from its having a spreading head adorned with large and beautiful foliage, deserves the attention of ornamental planters.

The Pennsylvania Maple is but a small tree, which in some situations may be considered rather as a shrub. It sometimes grows to the height of about fifteen feet, with a slender stem, covered with a whitish bark, and sending forth several red branches. The flowers are in long pendulous racemes, of a greenish yellow colour. The seeds generally fall off before they are ripe. It is a native of Pennsylvania.

The Cretan Maple is a low tree, having much resemblance to the Montpellier sort. The leaves while young are ovate, but afterwards have much similarity to those of ivy, being only of a much thinner texture, and having their petioles covered by a soft hairy down.

There is a variety of this tree in which the leaves continue green most part of the year when well sheltered. It is denominated the Evergreen Cretan Maple.

Culture.—Almost all the sorts and varieties of the Maple are of easy cultivation, each of them being capable of being raised from seed, and many of them by layering, cuttings, and budding. They thrive in most soils and situations, provided they be not too moist: the common sorts succeeding the best in such as are deep and inclined to moisture, but not hard or stiff; and the American kinds in those that have a dry and rather close state of mold.

In propagating them by seeds, as they do not in all the sorts ripen well in this country, the best way is to procure them from the places where the trees grow naturally. A cool shady place is the most suitable for this purpose. The mold being made fine, and beds marked out four feet wide, with length proportionate to the quantity; in these the seeds are to be regularly sown in the autumn, sifting over them the finest mold to the depth of half an inch. When the plants are come up, they must be kept clean from weeds, and frequently watered in the summer. In the spring following, the strongest may be drawn out, and planted in nurseries, in rows two feet asunder, and at the distance of a foot from each other in them, leaving the others to gain strength. In the second spring these also must have the same culture; and they may remain in the nursery, without any other trouble than keeping the ground clean from weeds in the summer, digging between the rows in the winter, and taking off all strong and irregular side shoots, till they are fit to be planted out. The trees raised in this way

grow faster, and arrive at greater heights, than those from layers: but they do not in general produce such quantities of flowers; which makes the latter method more eligible for those who want these plants for low shrubby uses. In these cases they should always have four or five years growth before they are finally planted out.

It is, however advised by some, that the seeds of the Common and Norway Maples should not be put into the soil immediately after becoming ripe; but be dried and preserved in sand till February or March, as the season may prove favourable; when they may be sowed in drills or beds eighteen inches broad, with alleys the same width, and covered three-quarters of an inch thick with mold. In the following February, or March, the alleys should be dug, and the roots of the plants cut about five inches under ground, which may be easily performed by means of a sharp spade, drawing the plants out where they stand too thick. These may be replanted in any good mellow soil, in rows eighteen inches asunder, and eight or nine inches from each other in the rows. In October, when the plants in general will be about two feet high, raise both the seedlings and those that were transplanted, shorten their tap-roots, cutting off any cross lateral branches, and remove them into rows two feet and a half apart, and fifteen inches distant in them, in order that they may continue for a year or two. Remove them again at the same season the succeeding year, and plant them in rows five feet asunder, and two and a half from each other, that they may continue four years. These will now be from twelve to fifteen feet high; and if required of a still larger size, they may be removed, and planted again eight or ten feet asunder; when any time after two, and not exceeding eight or ten years, they may be finally planted out where they are to remain. The use of removing these trees frequently when young is, that they are apt naturally to grow with tap roots; which this management prevents, and makes the plants root better, and become more easy in their growth when transplanted at a large size.

Though all the species of this genus are capable of being propagated by layers, it is never practised for the Common Maple. In this method the young shoots may be laid down at any time in the autumn, winter, or early in the spring; but the first is probably the best. By the same time in the following year they will have struck root, and have become good plants; when the strongest may be set out in the places where they are to remain; while the weakest may be planted in the nursery, in the same manner as the seedlings, for a year or two, in order to gain strength.

In propagating by cuttings, though all these trees are capable of it, it is a method chiefly

practised on the Ash-leaved and Norway Maples, as they take root this way more readily. The cuttings should be taken from the bottom parts of the last year's shoots early in October, and be planted in rows in a moist shady place. In the spring and summer following they should be watered as often as dry weather makes it necessary, and be kept perfectly clean from weeds. In the autumn they will be fit to remove into the nursery; though, if the cuttings are not planted too close, they may remain in their situations for a year or two longer, and then be finally set out, without the trouble of being previously planted in the nursery. These trees are also to be raised by budding, grafting, and inarching. But as the other methods are more eligible, these are seldom or ever practised, except for the variegated sorts and the large broad-leaved kind. The latter is indeed to be continued in no other way than by budding it on stocks of the Common Sycamore; as the seeds, when sown, afford only the Common Sycamore. But the seeds of the variegated kinds produce variegated plants; which renders the propagation of these sorts very expeditious, where plenty of seed can be had.

But where it is not to be obtained, in order to propagate these varieties, recourse must be had to budding; in performing which, some plants of the Common Sycamore, one year old, are to be taken out of the seed-bed and set in the nursery in rows a yard asunder, and the plants about a foot and a half distant from each other in the rows. The ground must be kept clean from weeds all summer, and be dug, or, as the gardeners call it, *turned in*, in the winter; and the summer following the stocks will be of a proper size to receive the buds, which should be taken from the most beautifully striped branches. The best time for this operation is about August; as, if it is done earlier, the buds will shoot the same summer, and when this happens a hard winter is apt to kill them. Having budded the stocks the middle or latter end of August, the eyes, or buds, being inserted on that side of the stock which faces the north, towards the beginning of October the bass by which it was tied may be removed, as it will begin to pinch and confine the bark, as well as the bud, too much. In the spring, just before the sap begins to rise, or the trees begin to shoot, the head of the stock should be cut off in a sloping direction just above the inserted bud: by these means, and that of constantly rubbing off such shoots as come from the stocks, the shoot from the inserted bud will be rendered more strong and healthy. The trees thus raised may remain in their situations for a year or two longer, or be transplanted into the places where they are intended for, in the autumn or spring following; care being constantly taken to keep the land well

dug between the rows, so as to prevent their being injured by the growth of coarse weeds, and the side buds trimmed from the stocks.

The autumn is upon the whole the best time for planting these and other deciduous trees, when they are strong and well rooted; yet when young they are apt to be injured by frosts, and thrown out of the ground in severe winters when planted at that season of the year.

The Common, Sugar, Norway, and Ash-leaved Maples, from the tallness of their growth, their having large spreading heads, and exuberant foliage, are proper for large plantations; and from the leaves being of different sizes, shapes, and colours, they make a considerable variety, when mixed with other trees of similar growth, especially if the variegated sorts be employed: besides, their large pendulous branches of flowers, though deficient in colour, are not without their beauty, especially in those of the Norway kinds. They are also useful in forming detached clumps, rural walks, groves, avenues, wherever shade is wanted.

ACETOSA, *Sorrel*. See RUMEX.

ACHANIA, a genus of plants which furnishes three species of shrubby exotics for the stove, but only one that is much cultivated.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx has a double perianthium, the outer having many leaves, and the leaflets being linear, permanent, and slightly coalescing at the base: the corolla is subclavate and convoluted; and the petals are five, obovate, oblong, erect, with a lobe at the base on one side, involving the column of stamina: the stamina are numerous filaments, coalescing into a writhed tube, longer than the corolla, free at top, and capillary: the antheræ are oblong: the pistillum has a subglobular germen: the style is filiform, of the same length with the tube of the stamina, ten-cleft at top, the segment spread, the stigmas capitate: the pericarpium is a subglobular, fleshy, five-celled berry: seeds are solitary on one side, convex and angular on the other.

The species principally cultivated is the *A. Malvaniscus*, Scarlet Malaceous Achania, or Bastard Hibiscus.

It has a woody stem, branching, ten or twelve feet in height: the leaves are cordate, angular, and acuminate, scarlet flowers coming out from the wings of their stalks: the petals are contorted, and succeeded by round berries of a scarlet colour and clammy feel. The plant is a native of South America and the West Indies. It flowers the greatest part of the year.

Culture.—Plants of this sort may be raised

from seed, when it can be procured perfectly ripe, by sowing it thinly in pots to the depth of about half an inch, in good, clean, light, rich mold; and afterwards plunging them into a gentle hot-bed. After the plants have come up to the height of two or three inches, they should be pricked out into other separate pots, be lightly watered, and again plunged into the hot-bed till fit to be removed into larger pots, where they are to remain.

As the seeds seldom ripen in this climate, it is probably a more expeditious method to propagate them by cutting: from the young shoots in the spring; which should be planted in pots of the same sort of earth as for the seeds, and be plunged into hot-beds of moderate heat, the air being kept from them at first as much as possible. In this way they soon take root, and should afterwards be gradually inured to the action of the open air in the green-house during the summer.

The plants, from their tender nature, require the constant assistance of the stove to preserve them from the effects of cold in this climate during the winter season; and when kept in warmth during the summer they flower better, and sometimes ripen their fruit. They may, however, be occasionally placed out in warm sheltered situations in the hot summer months, though with this management they seldom flower well.

And they must have the same attention and management bestowed on them afterwards as is necessary for other sorts of stove plants.

ACHILLEAS, a genus comprehending plants of the *Milfoil*, *Yarrow*, and *Sneeze-wort* kinds, which are fibrous-rooted herbaceous perennials of hardy growth.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the common calyx is ovate, and imbricated with ovate, acute, converging scales: the compound corolla is radiate: the hermaphrodite corollæ are tubular in the disk, and the females ligulate, being from five to ten in the ray: the proper corolla of the hermaphrodites is funnel-shaped, five-cleft, and spreading; the female obcordate, spreading, and trifid, the middle cleft being less than the others: the stamina in the hermaphrodites consist of five capillary, very short filaments, and the anthera is cylindrical and tubular: the pistillum in the hermaphrodites has a small germ, a filiform style of the length of the stamina, and an obtuse emarginate stigma: in the females, a small germ, filiform style of the same length as in the others, and two obtuse reflex stigmas: there is no pericarpium: the calyx is scarcely changed: the receptacle is filiform, elongate as the disk of the seeds, ovate, and twice the length of the calyx:

the seeds are solitary, ovate, furnished with florets, but without down; and the receptacle is chaffy and elevated, the chaffs being lanceolate, of the length of the florets.

The species are numerous; but those mostly cultivated in the garden, and employed as ornamental plants, are, 1. *A. Mellifolium*, Common Milfoil or Yarrow; 2. *A. Ptarmica*, Common Ptarmica or Sneezewort; 3. *A. tomentosa*, Hoary Yellow Milfoil; 4. *A. Clavennæ*, Silvery-leaved Milfoil; 5. *A. nana*, Dwarf Hoary Milfoil; 6. *A. Ægyptiaca*, Egyptian Hoary Sneezewort; 7. *A. abrotanifolia*, Southernwood-leaved Milfoil; 8. *A. macrophylla*, Long Feverfew-leaved Sneezewort. The three first are, however, in most esteem as garden plants.

In the first species, the root is perennial and creeping, the stem rising to the height of a foot or more; the leaves alternate, doubly pinnated, the lobes cut into narrow segments; the flowers in close broad-topped corymbs standing on hoary peduncles. It flowers from June to September.

The variety with purple flowers of different shades is the sort most generally cultivated in gardens for the purpose of ornament.

The second has likewise a perennial root, with the stem reddish, often rising to two feet in height; the leaves alternate, spear-shaped, with the edges sharply serrated; the flowers in loose, compound, upright, villous, leafy corymbs, at the ends of the stems, of a whitish yellow colour.

The variety with double flowers, usually known by the titles of Double Ptarmica or Bachelors' Button, is that which is mostly cultivated. It flowers in July and August, or later.

In the third, the stems are many, leafy, and not more than a foot in height; the leaves pinnated, rough, and hoary; the lobes narrow and indented; the flowers of a fine yellow colour, continuing long in blow. It is a native of Spain, and the southern parts of France; but capable of being cultivated in the open air in this climate.

The fourth species is a plant of but humble growth, seldom rising more than six inches in height. The leaves are pinnatifid, plain, obtuse, and hoary, having a silvery appearance. The flowers are of a white colour, and grow in flat corymbs. They appear in June and July. The plant is a native of the Alps.

The fifth is a very small plant; the stem being frequently bent: the leaves are pinnated, indented, and downy: the umbels are of a white colour and globular form. It is of hardy growth and easy culture.

The sixth is a plant that rises to the height of from nine inches to a foot. The leaves are pinnated, having the lobes obtusely spear-shaped,

and indented at the edges; they have a silvery appearance, and remain all the year. The flowers are produced in corymbs on the tops of the stems, coming out from June to September, and some of them frequently continuing most part of the winter. From the plant growing close and low, it has at all seasons a pretty effect. It is a native of the Levant, but has been long cultivated here.

The seventh species grows to the height of two feet and a half, having pinnated supra-decompound hoary leaves that are cut into very narrow segments, and which stand remote. The flowers are of a yellow colour, appearing in June and July.

And in the eighth there are many stems which rise to the height of nearly three feet, having on their tops loose branching corymbs of white flowers. The leaves are pinnated and deeply serrated, the outmost wings the largest. It is a native of the Alps, extremely hardy, thriving well in open exposures, in almost any sort of soil. The flowers appear in July and August.

Culture.—These plants may be propagated in different ways according to their kinds; as by parting the roots, cuttings, slips, and seeds.

The first method may be practised on all the sorts, either in the autumn or spring season.

In some of them, as the Egyptian sort, which seldom produces perfect seed in this climate, it may be performed by cuttings or slips, which should be planted out in a warm, rather dry, shady border, during the summer season.

In those sorts that ripen their seed in a perfect manner, the best method is by sowing it in a bed of fine light mold about the middle of March, or in the beginning of April, covering the seeds in very thinly. The plants will in general soon appear, and be ready to be transplanted into the situations where they are to remain, in the following autumn. In this way, when not injured by the severity of the winter, they mostly flower the succeeding spring.

The Egyptian and Silver-leaved species require dry soils and warm sheltered situations; as the first is liable to be destroyed in severe winters by the frosts in this climate, and the roots of the latter to be destroyed by too much moisture in the same season. In exposed situations it may be advisable to have a few plants of the former sheltered under a frame in pots. As most of the other sorts are sufficiently hardy, they require but little attention in their cultivation. They may be employed with good effect in the fronts of borders and other parts, in shrubberies and other pleasure grounds, as by the woolly appearance of the leaves in many of the kinds, and the long continuance of the flowers in others, they often form an agreeable diversity and pleasing contrast.

ACHRAS, a genus comprehending the Sapota Tree or *Mammee Sapota*, an exotic, which in its native situation rises to the height and size of a large tree; but when cultivated in the stove in this climate seldom exceeds that of a shrub.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a perianthium, consisting of six ovate, concave, erect leaflets, the outer broader and shorter, and the inner coloured: the corolla is one-petalled, ovate, of the same height with the calyx, with the border cut into six subovate flat divisions, and scales at the jaws of the corolla, equal in length to the divisions, narrower, spreading, and emarginate: the stamina have six short awl-shaped filaments at the jaws of the corolla, alternate with the divisions, bent inwards: the antheræ are sharp: the pistillum has a roundish, flattened germen: the style is awl-shaped, and longer than the corolla; and the stigma is obtuse: the pericarpium is a globose, very succulent pomum with twelve cells: the seeds are solitary, ovate, shining, scarred on one side, and pointed at the base.

There are several species; but those cultivated in the stove in this country are, 1. *A. Sapota*, Common Sapota Tree; 2. *A. Mamosa*, Mammee Sapota.

The first is a tall tree without branches to a considerable height; spreading out in the head with numerous small branches growing rather thick and close together: the bark is of a darkish gray colour; thick, rough, and chopped. The leaves are large, oblong, and ovate. The fruit is round and smooth, bigger than that of the quince; the rind thick, gray, becoming yellow and tough when ripe: the flesh is also of a yellowish colour, having two large rough flat stones in the middle: the taste and smell are very fine.

The second is likewise a tall straight-growing tree with ash-coloured bark, the branches coming off on every side so as to constitute a regular head: the leaves are spear-shaped, nearly a foot in length, having often the breadth of three inches in the middle: the flowers are cream-coloured, and succeeded by large oval or top-shaped fruit, with a brownish cuticle or covering, beneath which is a thickish pulp of a russet colour and luscious taste, frequently called, from its resemblance to the quince, Natural Marmalade. This tree is often cultivated in the gardens in many of the West-India islands for the sake of the fruit.

Culture.—These trees are not capable of being preserved in this climate unless attended to with great care, and kept in the warmest and best regulated stoves. Each of these species may be propagated by planting the stones: but

as they do not keep well when taken out of the fruit, this should be done in their native situations as soon as they are removed, in tubs of good mold placed so as to have the advantage of the morning sun, the earth being kept constantly well watered. On the plants appearing they should be well protected from the attacks of insects, and from being injured by weeds. When about a foot in height they may be sent to this country in the early part of the summer, in order that they may make good root before the winter sets in. A little water should be occasionally given them in their passage while in a hot climate; but as they advance towards a cold one this should be applied more sparingly, care being taken to guard them well from being destroyed by the salt water. On their arrival they should be carefully removed from the tubs, with a little of the mold about their roots, and placed in pots of fresh earth, in order to be plunged in moderate bark hot-beds, shading the glasses when the weather is hot with mats until they have taken new root, not giving them too much water at first, particularly if the earth they came in be moist, as too much water injures the plants before they are well rooted; but afterwards they should be often refreshed with water, especially in hot weather. And they should have the air freely admitted to them, in order to prevent the attacks of insects upon them. When insects seize them they should be carefully removed by means of a sponge, otherwise the plants will be greatly injured in their growth.

During the winter season they are to be planted in the warmest parts of the stove, and in very cold weather have but little water given them, though occasionally refreshed with it when the earth is become dry. When they retain their leaves during this season, a larger proportion of water will, however, be necessary than where the contrary is the case. As the plants advance in size they are to be removed into larger pots; but care should be taken not to overpot them, as by that means they are very liable to be destroyed.

Plants of this kind have but little merit, except for the variety which they afford, as it is necessary to keep them constantly in the heat of the stove.

ACHYRANTHES, a genus the plants of which are mostly herbaceous, somewhat shrubby, perennials of the tender exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Amaranthi*.

The characters of which are: that the calyx consists of an outer perianthium, that is three-leaved, lanceolate, acute, permanent; and of an inner one that is five-leaved and permanent: it has no corolla: the nectarium has five valves

surrounding the germ: bearded at the tip, concave and caducous; the stamina are filiform, the filaments of the length of the corolla, and the antheræ are ovate and incumbent: the pistillum has a superior turbinate germ: the style is filiform, of the length of the stamina, and the stigma is bifid and villous: the pericarpium is a capsule, roundish, one-celled, not gaping; and the seed is single and oblong.

There are several species, but only one that is much cultivated by gardeners. This is the *A. aspera*, or Rough Sicilian Achyranthus.

It is a plant which rises with an erect stem to nearly three feet in height, having oblong pointed leaves, the flowers coming out from the extremities of the branches in long spikes. The seed, which is inclosed in a sort of chaffy covering that can scarcely be called a capsule, is ovate, oblong, nearly cylindric, having a sort of small beak on the side, and is of the colour of honey. The flowers appear in July and August, and the seeds become ripe about September.

Culture.—It is capable of being raised, either in the spring or autumn, from seed by means of a hot-bed, and also by cuttings; but the first is by much the best method, as being more certain. When the plants are become strong, they may be removed into the open ground in pots during the summer months; and when set into a warm greenhouse during the winter season they may be preserved for two or three years or longer. This plant is cultivated more for the sake of variety than the purposes of ornament, as it possesses but little beauty.

ACONITUM, *Aconite*, *Monk's-hood*, or *Wolf's-bane*, a genus that comprehends several plants of the hardy herbaceous perennial kind, with tuberous or fibrous roots.

It belongs to the class and order *Polyandria Trigynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that it has no calyx: the corolla consists of five unequal petals opposite in pairs; the highest being helmet-tubed, inverted, and obtuse; the two lateral ones broad, roundish, opposite, and converging; and the two lowest oblong and bending downwards: the nectaries are two, concealed under the first petal, fistulous, nodding, with mouth oblique, and the tail recurved, sitting on long subulate peduncles: in the same circle with the nectaries there are six little, very short, coloured scales: the stamina are subulate filaments, very small, broader at the base, inclining towards the first petal: the antheræ are erect and small: the pistillum has from three to five oblong germs, ending in styles the length of the stamina: the stigmas are simple and reflex: the pericarpium has as many capsules as the styles, ovate, subulate, straight,

one-valved, gaping inwards; the seeds are many, angular, and wrinkled.

The species generally cultivated in pleasure-grounds for the sake of ornament are: 1. *A. Pa-pellus*, *Napellus*, *Common Monk's-hood*, or *Blue Aconite*; 2. *A. Lycoctomum*, *Great Yellow Monk's-hood*, or *Wolf's-bane*; 3. *A. Anthora*, *Salutary Monk's-hood*; 4. *A. Pyrenaicum*, *Pyrenean or Fennel-leaved Monk's-hood*, or *Wolf's-bane*; 5. *A. Cammarum*, *Purple Monk's-hood*, or *Wolf's-bane*; 6. *A. album*, *White Monk's-hood*, or *Wolf's-bane*; 7. *A. variegatum*, *Vari-egated or Small Blue Monk's-hood*; 8. *A. uncinatum*, *Hooked American Monk's-hood*.

In the first of these species the root is simple, woody, tuberous, unequal: the stem is erect, firm, covered with leaves eighteen inches in height, and terminated with a thick cylindric spike of flowers. The leaves have a blackish-green colour, are firm and shining, being three-parted in the middle lobe, and deeply two-parted in the side ones; the small divisions acutely but unequally trifid. It is a highly poisonous plant; which renders its culture in the garden less attended to than would otherwise be the case. It comes into blow about August.

The variety with long spikes of blue flowers is the most usually met with in garden culture. It grows to the height of four feet, and has spikes two feet or more in length. It flowers in May and June, and the seed becomes ripe about September. There is also a rose-coloured, a white-flowered, and a variegated blue and white variety of *Napellus*.

The second has the stem eighteen inches high or more, leafy, and very little branched. The leaves are broader than in the other sorts, cut half way into three lobes, which are doubly trifid, the side ones being very deeply two-parted. The spike is simple, with few flowers. It flowers about the middle of June, and, if the season be not too hot, will continue in blow till August.

There is a variety of this species with large palmated leaves, which are smooth.

In the third species, the root consists of from two to four angular fleshy bulbs. The leaves have a furrow along the middle, and are narrow, three-parted, the side-lobes being deeply two-parted, the middle one doubly trifid, with long sharp gashes; the side ones being more irregular. The stem is from a foot to eighteen inches in height, and a little branching. The peduncles sustain one or two flowers. The seeds are wrinkled and multangular. It flowers about the middle of August, and often continues in beauty till the middle of September: the flowers are not so large as those of some of the other sorts, but, being of a sulphur-colour, make a pretty appearance in the borders of the flower-garden.

In the fourth, the stem rises to the height of about four feet: the leaves are divided into long segments, deeply jagged into many narrow parts which lie over one another like scales, having long spikes of pale yellow flowers of a middling size. It may be allowed a place among shrubs, or in such parts of the garden as are not much frequented by young children.

The fifth species has a tall stem, frequently rising to the height of six feet: the leaves are divided into numerous wedge-shaped lobes, which are cut into many acute parts: the flowers are large and numerous, and of a pale blue colour.

The varieties chiefly cultivated are: the Wedge-lobed Purple, the Wedge-lobed Blueish Purple, and the Wedge-lobed Deep Blue Aconite.

The sixth sort has a stem rising sometimes nearly to the height of the former, with palmated three-parted leaves acutely divided, and large white flowers.

The seventh species seldom rises to more than the height of two feet: the leaves are many-parted, the segments being half cut through, and the upper ones the broadest; the spikes of flowers small, and variegated with blue. It flowers about the end of June.

In the eighth the leaves are three- or five-lobed, angular, and toothed: the flowers are blue, and come out singly, having the top of the helmet hooked, extending straight further than the tail.

All the species have perennial roots; but the stems and leaves are annual, rising in the spring, and decaying in the autumnal months.

Culture.—These are plants that require little difficulty in their culture. All the species and varieties may be easily raised from seed, as well as by parting the roots. In the first method the seeds should be sown in autumn, on good common earth, in a rather shady situation: this is said to be preferable to sowing them in the spring months, as where that mode is practised they seldom come up till the year after, whereas in this they commonly appear in the spring following. They are to be kept clean from weeds during the ensuing summer months, and must have water given them occasionally when the season turns out dry, until the plants are in a state to be pricked or planted out in a bed or border, which should be done at the distance of about fourteen inches each way, taking the plants up carefully, and watering them as often as may be necessary until they have taken fresh root. After this they demand no other management, but that of keeping them clean from weeds, till they are ready to be finally planted out in the succeeding autumn. They afterwards require little attention, except that of cutting down and clearing away their stems and other parts every autumn.

Where the method by parting the roots is practised, it is best performed in October, or towards the month of March. In the common sorts, every piece that possesses a bud or eye will readily grow and produce a plant, on being set in good earth.

As these plants, especially all the common kinds, delight in such shady situations as are not much exposed to the drop of trees, they are well calculated for those large borders, clumps, and other compartments in ornamented grounds, that are not much overhung by trees or tall-growing shrubs, as in such exposures they continue much longer in flower. Some of the blue sorts will likewise thrive under trees, where they do not stand too closely together. From their containing large handsome spikes of flowers that continue long in blow, and their having much diversity in their leaves, they afford considerable variety when planted out in such situations as mentioned above. There is, however, one objection to them, which is their possessing poisonous qualities, which render them improper in places where children are much admitted.

Most of the blue sorts have been long in cultivation, and almost all the other kinds may be procured from the nurseries and flower-gardens.

ACORN, the seed or fruit produced by the different species and varieties of the oak. It is a sort of nut, from which trees of this kind are mostly raised. See *QUERCUS*.

ACORUS, a genus comprehending hardy, herbaceous perennials, of the Sweet Rush or Flag kind, cultivated for the sake of their fragrant aromatic qualities.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx is a cylindric, simple spadix, covered with floscules, without spatha or perianthium: the corolla is composed of six petals, obtuse, concave, loose, thicker at the top, and in a manner truncate: the stamina are thickish filaments, somewhat longer than the corolla; and the antheræ are thickish, twin, terminal, and adnate: the pistillum is a gibbous germ, rather oblong, and of the length of the stamina, without style: the stigma is a prominent point: the pericarpium is a short triangular capsule, attenuated to both ends, obtuse, and three-celled: the seeds are many, and ovate-oblong.

The species are two: 1. *A. Calamus*, *Calamus aromaticus*, Common Sweet Rush; 2. *A. gramineus*, Grass-leaved Sweet Rush, or Chinese Sweet Grass.

The first is a plant of the aquatic kind, being found to grow naturally in watery situations in

different parts of the kingdom. It is sufficiently distinguished by its long, narrow, sword-shaped leaves, which are of a bright green colour, waved along one of the edges, and when broken yielding a strong aromatic scent; and also by its oblong, cylindric spike of flowers, coming out from the side of the stem at the edge of the leaf, which is generally single, though sometimes double. The root is long, cylindric, tuberous, spongy, marked with rings, and putting out abundance of fibres, which are the proper roots of the plant. It flowers in the months of June and July.

The second sort has the roots in tufts, with a few thready fibres: the stem is scarcely any, or very short: the leaves are equitant, erect, somewhat alternate, linear-sword-shaped, pointed, a little thickened at the margin, smooth, evergreen, a span long, edged at the base, with a white, pellucid, shining membrane: the stalk like the leaves, but a little shorter, erect, somewhat thickened under the spadix, afterwards narrower, and altogether leafy; about equal to it in length, scarcely longer. The spadix, arising laterally from the stalk near its top, is erect, cylindrical, obtuse, being entirely covered with yellowish-green sessile florets.

The whole plant has an aromatic smell when bruised, much resembling the Sweet Flag, from which it is distinguished by the shortness of that portion of its stalk which is above the spadix, as well as by all its parts, except the florets being five times smaller than in that plant. Professor T. Martyn observes in his Dictionary, that it is probably a native of China, being at least frequently cultivated, for the sake of its smell, in pots, about the habitations of the Chinese.

Culture.—The first of these plants requires little trouble in its cultivation, as it may be propagated by its creeping roots with great facility. It should be transplanted from its natural situation in the autumn or early spring months, and placed in such moist ground as that its roots may be well supplied with water, for where this is not the case it seldom produces flowers. The situation should likewise be open, as it does not thrive well under the shade of trees.

It has been suggested that the root of this plant might be employed as a spice, when reduced to the state of a powder; but it is chiefly cultivated on account of the fine smell which it affords, and the ornament of the flowers.

The second, or Chinese sort, may be propagated by parting the roots, and placing them in pots of good mold in dry stoves, where they will require only a moderate degree of heat. This species is cultivated for variety, as well as the fragrant odour which it affords.

ACROSTICHUM, a genus including various

plants of the fern kind, some of which may be cultivated for the purpose of ornament and variety.

It belongs to the class and order of *Cryptogamia Filices*.

The characters of which are: that the fructifications cover the whole inferior surface of the frond or leaf.

The species are extremely numerous: but those hitherto cultivated for the purposes of ornament in open exposures are: 1. *A. septentrionale*; 2. *A. australe*; 3. *A. rufum*; 4. *A. Marantæ*; 5. *A. ilvense*.

The first grows in tufts somewhat resembling rushy grass. The fronds are from one to four inches in length; commonly a little curved, narrow, entire at the base, but dilated towards the extremity, and divided into two or three lanceolate segments, which are again irregularly cut into two, three, or more, smaller recurved ones. The fructifications first appear in small lines, but in the adult plant the lower surface of the leaf is totally covered with brown dusty capsules.

The second species much resembles the above; but it is silvery, and more regularly divided, having purple fructifications proceeding from the inner edge, which are cleft longitudinally; the last divisions of the fronds being subulate, roundish, and straightish.

The third sort rises to eighteen or twenty inches in height. The cup is round, covered with ferruginous hair, and leafy almost from the root. The pinnae are about an inch from each other, on a small pedicel; each pinna being about an inch long, and half an inch broad at the base, whence they decrease to the end, which is round; and they are covered all over with a rusty woolly hair.

The fourth species has the stipes about seven inches high, of a dark purple colour. The frond is almost bipinnate, lanceolate, closely imbricated beneath, with chaffy orange-coloured scales. The leaflets are opposite, almost pinnate; having the pinnae ovate, obtuse, thick, quite entire; but the lower ones often toothed on each side at the base. The fructifications spread between the leafy scales over the whole under surface. Sometimes the stipes is blood-red, all hairy, from eight inches to a foot in height.

The fifth has much resemblance to the above, but only rises a few inches in height, seldom exceeding seven. In this the stipes is of a green colour.

There are several other species described by Professor T. Martyn, in his edition of Miller's Dictionary, that may be cultivated with equal facility, but they have been yet little introduced among gardeners.

Culture.—All the above species may be cultivated and preserved by being planted out in pots

filled with gravel or lime rubbish. Hence they are proper for the purpose of adorning different kinds of artificial rock-work, and for being planted upon old walls.

But those species which are natives of warm climates require to be planted in pots, and plunged into bark-pits, in order to preserve them in this country.

ACTÆA, a genus comprehending plants of the Herb Christopher or Baneberry kind, which are hardy herbaceous perennials, of tall growth.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a perianthium of four leaves, with roundish, obtuse, concave, and caducous leaflets: the corolla has four petals, acuminate at both ends, longer than the calyx, and caducous: the stamina consist of numerous, usually about thirty, papillary filaments, broader at top: the antheræ are roundish, twin, and erect: the pistillum has a superior ovate germ, no style, and a thickish, obliquely-depressed stigma: the pericarpium is an oval-globose, smooth, one-furrowed, and one-celled berry; and the seeds are many, semi-orbicular, and lying over each other in two rows.

The species that chiefly deserve notice for the purpose of cultivation are: 1. *A. spicata*, Common-spiked, Black-berried Herb Christopher; 2. *A. racemosa*, Clustered, Long-spiked, American Herb Christopher.

The first sort grows two feet and a half high, the footstalks of the leaves rising from the root; these divide into three smaller footstalks, each of which divides again into three, and these have each three lobes, so that each leaf is composed of twenty-seven lobes or small leaves. And the flower-stem which rises from the root has leaves of the same form, but smaller. On the top of the stalk appear the flowers, which grow in ramose spikes, and are of a pure white; these come out in May, and are succeeded by black shining berries about the size of peas, which ripen in autumn.

There is a variety of this plant with white berries, and another in which they are of a red colour.

The second kind has large compound leaves, which rise immediately from the root, and are branched after the same manner with the first. The flower-stems frequently rise to the height of four or five feet or more. The flowers are white, in a long spike, reflex at the top. It flowers in June, or the beginning of July, but does not perfect seed in this climate. It is a native of North America, where it is often distinguished by the title of Black Snake-root.

Culture.—The propagation of these plants may

be easily effected by sowing the seed on a shady border of common earth in the autumn, as soon as they are taken from the plants, as when the sowing is deferred till the spring they are liable to remain in the soil until the same time in the following year before they come up, and much time is lost. From the irregular manner in which the plants mostly appear, the mold of the beds should be as little as possible disturbed, lest they be destroyed. When fully grown in the succeeding autumn, they may be transplanted into the situations where they are to remain, which should be rather shady.

The seeds of the second species are mostly sent annually from America, and should be put into the ground as soon as possible after they arrive.

As these plants rise to a considerable height, and are ornamented with leaves on the lower part of the stems, and with handsome spikes of flowers on the upper parts, they are well suited for adorning the common compartments and clumps of pleasure-grounds, especially where there is a degree of shade without the inconveniences of large trees; and also in the intervals between large shrubs in conspicuous situations, where, from their hardy nature, they will only require the same treatment as them.

As these plants are perennial in root, but annual in the leaf and stem, these last require to be cut off and cleaned away every autumn.

The berries of these plants are believed to have a poisonous property, a single berry being said to be capable of instantly destroying fowls and other birds.

ADANSONIA, a genus furnishing a tree of the deciduous kind, which grows to an extraordinary size in its native soil. It is the *African Calabash Tree*, which, when cultivated here, does not rise to any great height.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

Its characters are: that the calyx is a one-leaved, semiquinquefid, cyathiform perianthium, with divisions revolute, and deciduous: the corolla consists of five roundish, nerved, revolute petals, connected by the claws with each other and the stamina: the stamina have numerous filaments united at bottom into a tube, which they crown, expanding horizontally: the pistillum has an ovate germ, very long, tubulous, and variously intorted style: the stigmata are many, often ten, prismatic, villous, and radiate-expanded: the pericarpium is an ovate, woody, not gaping, ten-celled capsule, with farinaceous pulp, and the partitions membranaceous: the seeds are numerous, kidney-shaped, rather bony, being involved in a friable pulpy substance.

There is only one known species, which is the *A. digitata*, Ethiopian Sour Gourd or Monkey's Bread.

In this species the young plants, and also most of the new branches, have single spear-shaped leaves towards their lower part; but at their extremities the leaves have some three, and others five lobes, of the same size and form as the lower, which are disposed like a hand; these are entire, ending in a point, and fall off in the winter season. The stems are large and woody, but of a soft texture, and have generally a large swelling near the root. According to the account given by monsieur Adanson, some of these trees, in Senegal and other parts of Africa, measured from sixty-five to seventy-eight feet in circumference; but their height was not extraordinary. The trunks were from twelve to fifteen feet high, before they divided into different horizontal branches which touched the ground at their extremities; these were from forty-five to fifty-five feet long, and were so large that each branch was equal to a very large tree: and where the water of a neighbouring river had washed away the earth, so as to leave the roots of one of these trees bare and open to sight, they measured one hundred and ten feet long, without including those parts which remained covered by the earth.

It affords a fruit which, when fresh and eaten with sugar, is said to be pleasant to the taste, being of an acid flavour.

Culture.—The method of propagating this tree is by seeds, which must be procured from the country where it grows naturally, for it does not produce any in this climate: these should be sown in pots, and plunged into a hot-bed, where, in about six weeks, the plants will come up, and in a short time afterwards be fit to transplant; when they should be each planted in a separate pot, filled with light sandy earth, and plunged into a fresh hot-bed, taking care to shade them until they have taken new root; after which they should have free air admitted to them every day in warm weather, but must be sparingly watered; for as their stems are soft, especially when young, too much moisture is apt to make them rot. As the plants advance in growth they are to be shifted into larger pots, but must constantly be plunged into the bark-bed, being too tender to thrive in this country without this artificial heat: they must therefore constantly remain in the stove with other tender exotic plants. The plants when young make great progress in their growth where they are properly treated; for in three years many of them have been more than six feet high, and have put out several lateral branches; their stems being in proportion; but after four or five years' growth they are almost

at a stand, their annual shoots rarely exceeding two or three inches.

These trees are only cultivated in this country for the singularity of their appearance, and the variety which they afford in the hot-house or stove.

ADENANTHERA, *Bastard Flower Fuce*, a genus which contains plants of the tree, evergreen, and exotic kinds; and of Indian growth.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters of which are: that the calyx is a one-leaved, five-toothed, very small perianthium: the corolla is five-petalled, and bell-shaped: the petals are lanceolate, sessile, convex inwards, and concave underneath: the stamina are subulate filaments, erect, and somewhat shorter than the corolla: the antheræ are roundish, incumbent, bearing a globose gland at the outer tip: the pistillum is an oblong germen, gibbous downwards; style subulate, and as long as the stamens: the stigma is simple: the pericarpium is a long, compressed, membranaceous legume, and the seeds are very numerous, roundish, and remote.

There is only one species that has yet been introduced into cultivation in this country, which is the *A. pavonina*.

It is a tree with prodigious decomposed or doubly pinnated leaves: the leaflets are ovate, obtuse, quite entire, on very short petioles, sometimes alternate, sometimes opposite: the panicle consists of simple, thick racemes, with the floscules on equal pedicels. The flowers are comparatively very small, and of a yellow colour. The legume is nearly a foot in length, repand at the sutures, and obscurely torulose at the seeds, smooth, one-celled, two-valved; the valves after they are open being loosely and spirally twisted. The seeds are few in proportion to the length of the legume, obovate-rounded, convexly lens-shaped, highly polished, of a shining black colour, with a circular streak in the middle on each side. This is a tree which in its native state grows to a very large size, and the timber is in much use on account of its great solidity. It flowers in September, bears fruit at the beginning and end of the year, and is never without leaves. The seeds, besides being eaten by the common people, are of great use, on account of their equality, for weights, each of them weighing four grains: they also make a cement by being beaten up with water and borax.

There is a variety of this plant which has vivid scarlet seeds, but which Miller found to be extremely slow in its growth.

In this country it only rises to the state of a shrub.

Culture.—The method of raising plants of this sort is from the seeds, which are obtained from abroad, and sown in pots of good mold, their vegetation being promoted by the assistance of a hot-bed, under glasses, or the bark-bed. After the plants are a little advanced, they should be placed out in the bark-stove of the hot-house, where they must constantly remain; and where, from their large and beautifully branching leaves, they afford a fine appearance. They have not yet been found to produce flowers in this climate.

ADIANTUM, *Maiden-hair*, a genus comprehending several herbaceous perennial plants of the fern kind, some of which have been introduced into culture.

It belongs to the class and order *Cryptogamia Filices*.

The characters of which are: that the fructifications are collected in oval spots at the end of the fronds or leaves, which are folded back; or at the reflex tip of the frond underneath.

The species are very numerous, but there are only a few introduced into cultivation; the principal of which are: 1. *A. Capillus Veneris*, True Maiden-hair; 2. *A. pedatum*, Canadian Maiden-hair; 3. *A. reniforme*, Kidney-leaved Maiden-hair; 4. *A. fragrans*, Sweet-scented Maiden-hair; 5. *A. pteroides*, Heart-leaved Maiden-hair; 6. *A. villosum*, Hairy-stalked Maiden-hair; 7. *A. trapeziforme*, Rhomb-leaved Maiden-hair.

In the first, the fronds, branches and petioles are of a shining blackish colour. The leaves are at first roundish, afterwards wedge-shaped. The stem is slender, and of a dark purple colour. The petioles of the branches are very large, sustaining three leaves, which are smooth, tender, toothed in the further part, fan-shaped, dilated, either cut shortly into lobes, or more deeply, three-, four-, seven-lobed; the lobes obtuse. There is one or two fruit-bearing dots to each tooth, to which the edge of the leaf is attracted. The roots are of the fibrous creeping kind. It is a native of France, Italy, and other southern kingdoms.

In the second species the root is small. The stipes is of a dark purple colour, eighteen inches in height or more. The leaves have much resemblance to the comb of a cock. It is a native of Canada in America.

The third sort has the fronds somewhat of the kidney form, the stalks being adorned with numerous flowers. It is a native of the Island of Madeira.

The fourth species has the fronds bipinnate; the pinnae being ovate, sublobed, obtuse, and naked underneath. It is an inhabitant of the same island as the above.

In the fifth, the stipes are seven inches high, of a purple colour, smooth. The pinnae are streaked;

the edge being covered underneath with as many white scales as there are notches, covering the fructifications. It is a native of the Cape of Good Hope.

The sixth sort rises to the height of two feet. The stem is of a black colour, strong, triangular, and covered with a hairy, ferruginous, mossy substance. The fronds proceed from this about a foot from the ground. The pinnae are alternate; the pinnules being an inch long, and about half as broad, and of the figure of a trapezium. It is a native of Jamaica.

In the seventh species the leaflets are alternate; the pinnae being of a rhomboid form, gashed, bearing fruit on each side. It is found in its native state in New Zealand.

Culture.—The first and second species of these plants require little or no trouble in their cultivation, being propagated simply by parting their roots. The latter is however the most tender, as though it will often stand through the winter in the open air, when the winter is not too severe, yet when that season is very severe it is liable to be destroyed by the frosts. A plant or two should of course always be kept under the shelter of a frame, or the greenhouse. The first succeeds much better when planted out in pots filled with gravel and lime rubbish than if put in good mold.

The third, fourth, and fifth species require the constant protection of the greenhouse, in order to preserve them in the winter season.

And the last three sorts, from their being naturally inhabitants of hot climates, demand the continual aid of the stove to preserve them.

All the species are useful for the purpose of affording variety, and the three last highly curious and ornamental among collections of exotics, on account of their black shining stems, and the great irregularity in the shape of their leaves.

ADONIS, a genus comprehending several annual and perennial herbaceous plants of the flowery tribe; the *Flos Adonis*, Adonis Flower, or Pheasant's Eye.

The characters are: that the calyx is a five-leaved perianthium, and the leaflets are obtuse, concave, a little coloured and deciduous: the corolla has from five to fifteen, but most commonly eight, oblong, obtuse, shining petals: the stamina consist of very short subulate filaments, and the antheræ are oblong and inflex: the pistillum has numerous germs collected in a head, no styles, and acute reflex stigmas; no pericarpium, but an oblong, spiked receptacle: the seeds are numerous, irregular, angular, gibbous at the base, reflex at the top, a little prominent, and naked.

The species chiefly cultivated are: 1. *A. au-*

tumnalis, Common Autumnal Red Adonis; 2. *A. æstivalis*, Summer Tall Yellow-flowering Adonis; 3. *A. vernalis*, Spring-flowering Yellow Perennial Adonis; 4. *A. Apennina*, Apennine Adonis; 5. *A. Capensis*, Cape Adonis; 6. *A. vesicatoria*, Blister Adonis.

The first of these species has the stalk about a foot high and upright, somewhat angular, hollow, of a purplish colour, hoary, and branched quite to the bottom; the branches being generally taller than the stalk which produces the first flower. The leaves are alternate, of a yellowish green colour; the lower ones petioled, and the upper ones sessile; all superdecompound: the segments numerous, capillary, pointed, and shining on the under side. The leaflets of the cup subovate, unequal, and of a purple colour, shorter than the corolla; the tips being toothed, and appearing as if bitten. The corolla consists of eight petals, seldom more, but often fewer, unequal, obcordate, the tip being irregularly notched, and of a scarlet colour, with the bottom internally black, but externally greenish. The stamens are about forty in number; the filaments filiform and white: the antheræ ovate, obtuse and compressed, of a blackish purple colour; the pollen being saffron-coloured. The head of the germs is short, and somewhat conical. The stigmas pointed, the points being turned back. The seeds are somewhat angular, pointed, reticulate and wrinkled. It is a native of most of the southern parts of Europe. It now also grows in this country, in many parts near London.

In the second, which is by some supposed scarcely distinct from the former, but by others is said to differ from it in having the flower smaller, with the colour a higher red; the branches are more open, and the fruit is of an oval form. The petals are from five to eight. It is a native of the southern countries of Europe, and flowers in May and June.

There is a variety of this which has a pale yellow corolla.

The third species has the stem branched from the bottom, hairy, but finally becoming bald, streaked, scarcely a foot high, equal, or not swelling at the joints. It has several leaves, which burst forth together from the root early in the spring, and cover the young stem; afterwards some of these sit at the bottom of the stem, whilst others are placed at the insertion of the branches, on very wide long sheaths, terminated by a multifid leaf, only one-third of the length of the sheath. Hence, properly speaking, there are no root-leaves. The stem- and branch-leaves are entirely different from the former; for the nearer they approach to the top of the stem the more decompounded they become, which is un-

usual. Their sheaths are very short, and half-stem-clasping; all the leaflets scarcely exceeding two lines in length, but which are rigid and pungent. There are no calluses at the insertion of the leaflets. The peduncle terminating, one-flowered, and half an inch in length. The cup, which scarcely emerges from the uppermost leaf, has the leaflets of a yellowish green or a sordid colour, hirsute, concave, or flat, lanceolate-ovate, and half the length of the corolla. The petals are more narrowed or lanceolate than in the following species, so as even to be linear. The seeds are thicker at the tip, hirsute, with a very slender dagger-point below the tip. Its large yellow flowers are produced at the end of March or the beginning of April; and the seeds ripen in August. It is a native of the mountainous parts of Germany.

In the fourth the stem is a foot and a half in height; in the young plant ash-coloured, but in a more advanced growth bald and entirely smooth, marked with lines; the branches being alternate and thicker at the joints. The root-leaves are very large, almost orbicular, four-fold and pinnate: the pinnae opposite, pinnules alternate: leaflets lanceolate-linear, acuminate, smooth and even; all the insertions marked with a white callus: the petiole half a foot long, grooved, sheathing the stem at its base. The lowest stem-leaf, at the base of the lowest branch, resembles the root-leaves, but is smaller: the sheath is wide, embracing the stem; but the petiole is scarcely half an inch in length. The leaves on the stem and branches are hardly petioled: they half embrace the stem, have scarcely any sheaths, and the pinnules are so near to each other that the leaves in general seem to be digitate-multifid. The sheaths do not lose their pubescence. The flower terminating, one on each branch: the petals obovate or lanceolate-ovate: the cups hairy, subglobose, coloured, concave, with lines or streaks of a different colour. The peduncles are grooved, but the stem is not. The seeds are ovate, surrounded with a rim, having a dagger-point curved back, and smooth.

The fifth species has the leaves radical; the leaflets rigid; and the petioles rough with hairs. The scapes leafless, round, hairy, and terminated by a compound umbel. The universal and partial involucre are six-leaved and lanceolate. Partial peduncles, three outer, three inner, and one central, bearing one flower; the rest four-flowered. The cup is ovate-oblong, concave, whitish; petals lanceolate, white, twice the length of the cup; the filaments linear, half the length of the petals: the antheræ two, ovate and small; the styles bent outward, the length of

the stamina: the stigmas obtuse, and the foliation involuted. It is found wild near the Cape of Good Hope.

The sixth is perfectly smooth, with hard firm leaves. It is also a Cape plant. The Africans use it for raising blisters.

Culture.—The first two sorts may be readily propagated by the seeds, which should be sown in a light soil, in the borders or clumps, where they are to remain and flower (for they do not bear transplanting well) in the autumn, about September or the beginning of October, as in that way the plants will appear in the following spring; but where the sowing is deferred to the spring, the plants seldom come to the state of flowering the same year. The seed should be covered to the depth of nearly half an inch; and when the plants are risen to the height of two or three inches they should be thinned out, till only two or three of the largest remain in each patch, as by that means they have a better effect when in flower. Some seed should likewise be sown in both warm and shaded situations, in order that the period of their flowering may be protracted to a greater length. Where the method of transplanting is practised, the plants should be removed as soon as possible after they appear, and have a very slight watering given them for a few days when the season is dry.

The only culture that will afterwards be required, in either of the methods, is that of occasionally weeding, so as to keep the plants perfectly clean, and watering them when necessary.

These two are annual plants both in root and stem, coming up, attaining their full growth, perfecting their seed, and wholly decaying in the same year; they must of course be sown annually.—See ANNUAL PLANTS.

In the third and fourth species the propagation is also effected without difficulty, both by sowing the seeds and parting the roots. When the first method is practised, it should be done as soon as possible after the seed has been ripened, in August or the beginning of September, in the same kind of soil and situation as the former, as they do not succeed well when put in much later: after the plants are come up they must be kept perfectly clean and free from weeds; and when the season is very dry occasionally watered, in order to promote their growth. The plants, after being thinned out, in the manner directed above, where they stand too thick, as they advance very slowly in their early growth, should be suffered to stand where they are sown until the second year. In afterwards transplanting them out where they are to remain, the most proper time is the autumn. They should not after this be disturbed, as when that

is the case the plants neither flower so well or with such vigour as under other circumstances.

In parting the roots, the business may be performed either in the autumn or the spring; but the former is to be preferred in general, as by that means the new plants are more fully established before the hot season sets in. These plants, being only perennial in root, require the stems to be cut off and cleared away in the autumnal months.

The last species, being more tender, requires the aid of the stove or greenhouse to protect it in the winter season in this climate. It may also be raised from seed, by sowing it in pots of good earth in the autumn or spring months, and placing it in the hot-bed or stove; being afterwards managed in the way of other tender exotic plants.

As the flowers of the first four species are mostly large and ornamental, and in some of them come out early in the season; they may be employed with good effect, in combination with other herbaceous plants, in adorning the anterior parts of the borders, clumps, and other compartments of shrubberies and other pleasure grounds.

The two Cape species are employed in affording an agreeable variety in the stove and the greenhouse.

ADOXA, a genus comprehending the *Tuberous Moschatel* or *Hollow Root*, which is a hardy herbaceous perennial of low growth.

It belongs to the class and order *Octandria Tetragynia*, and ranks in the natural order of *Succulentæ*.

The characters of which are: that the calyx is an inferior, bifid, or trifid, flat and permanent perianthium: the corolla is monopetalous, flat, and divided into four or five segments, with ovate, acute clefts, longer than the calyx: the stamina are subulate filaments, of the length of the calyx, and the antheræ roundish: the pistillum has a germ below the receptacle of the corolla: the styles are simple, erect, of the length of the stamina, permanent, and equal in number to the clefts of the corolla: the stigmas are simple: the pericarpium is a globose berry, between the calyx and corolla, the former being united below with the berry, umbilicate, and four- or five-celled: the seeds are solitary and compressed.

There is only one species, which is the *A. Moschatellina*, Moschatel, or Musk-smelling Adoxa.

It has the root perennial, creeping, toothed, and of a white colour: the root-leaves three or four, triternate, deeply cut, smooth and shining: the segments or lobes are ovate, with a short point: there are two leaves on the stalk with shorter petioles, and opposite: the stalk is some-

what taller than the leaves, simple and nearly square: the peduncle is square, naked and terminal: the head cubical, consisting of four lateral flowers, and terminated by a fifth: in the former, ten, in the latter, eight stamina; and in the former five, in the latter, four styles: the flowers varying much both in the divisions of the calyx and corolla, and in the number of the stamina. It flowers towards the end of March or the beginning of April, and the berries ripen in May; soon after which the leaves decay. These as well as the flowers have a musky smell.

Culture.—The propagation of this plant is best accomplished by offsets from the roots, which should be transplanted into the situations where they are to remain, in the summer or autumn, as soon as convenient after the leaves and branches have decayed. This plant succeeds best in shady situations, as under the foliage of shrubs, for when exposed to the full sun it seldom grows well. It is a low-growing plant, and does not possess much beauty; but from the above property it may be useful in adorning and affording a variety in wilderness quarters, and other places where it is difficult to get plants to grow on account of the shade.

ÆSCHYNOMENE, the *Bastard Sensitive Plant*, a genus including plants of both the annual and perennial exotic kinds, and of somewhat shrubby growth.

It belongs to the class and order of *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ* or *Leguminosæ*.

The characters of which are: that the calyx is a one-leaved, bell-shaped, sub-bilabiate perianthium, with equal lips, the upper bifid, and the lower three-toothed: the corolla papilionaceous, with a sub-cordate, scarcely gaping, large banner; sub-ovate, obtuse wings, shorter than the banner; and lunate, acuminate keel of the length of the wings: the stamina have ten filaments, single, and nine-cleft, and small antheræ: the pistillum is an oblong, villous, columnar germen: the style subulate and rising: the stigma simple, rather obtuse: the pericarpium is a long, flat-jointed, rough, one-celled legume, opening at the truncate joints: the seeds are solitary, between the joints, and kidney-shaped.

There are several species: but those mostly cultivated are, 1. *Æ. grandiflora*, Great-flowered *Æschynomene*; 2. *Æ. arborea*, Tree *Æschynomene*; 3. *Æ. coccinea*, Scarlet-flowered *Æschynomene*; 4. *Æ. Sesban*, Egyptian *Æschynomene*; 5. *Æ. aspera*, Rough-leaved *Æschynomene*; 6. *Æ. Americana*, American Hairy *Æschynomene*.

The first is a shrub rising from ten to fifteen feet in height. The trunk is upright, without

spines: the branches spreading a little, round and pubescent. The leaves are pinnate, alternate, scattered, a foot long: petioles round, thicker at the base and smooth. The leaflets from twelve to eighteen pairs, opposite, oblong, obtuse, entire, smooth on both sides, standing on very short petiolules. The peduncles are axillary, few, short, bifid or trifid: the pedicels short, and one-flowered. The flowers are pendulous, of a white colour, very large, frequently the size of a hen's egg. The cup is obtusely five-toothed, ovate-globose, swelling a little. The corolla resupinate: the banner wide, reflex, sub-cordate at the base, elliptic entire, waving on the edge: the wings oblong, sickle-shaped, with claws at the base, sharp, pressed close to the keel, which is a little shorter than the banner, undivided, sickle-shaped, angular in the middle, curved, and the outmost tip bifid. The legume is two feet in length, linear, compressed, with a membranaceous isthmus between the seeds, which are of a roundish form. It is a native of the East-Indies.

The second species grows to the height of six or seven feet, with a single stem: the leaves are smooth, and come out towards the top of the stalk, forming there a sort of head; they are composed of many pinnas, placed alternately on the mid-rib. The flowers proceed from the wings of the leaves, two or three together, are large, and of a copper colour.

The third is a smaller and lower tree than the first; but the head and leaves are more close: the latter are about a foot in length, and have twenty pairs of leaflets. From the axils proceeds a single peduncle, dividing into two, each of which bears a large flower, but somewhat smaller than that of the first sort, and the colour is red mixed with purple. The legume is a foot and half in length. It is a native of the East Indies, and of several of the islands in the South Seas.

The fourth has woody stems and branches, with smooth leaves composed of many blunt opposite pinnas. The flowers, which are small, and of a deep yellow colour, come out from the axils in long spikes hanging downwards. The legumes are smooth and taper-pointed, not jointed: the cups are bell-shaped, equal, five-toothed and spreading. It flowers in July and August, and is a native of Egypt.

The fifth rises to the height of four or five feet, with a single herbaceous stem, which is in some parts rough. The leaves come out on every side towards the top, forming a sort of head, and they are composed of a great number of smooth glaucous pinnas. The flowers proceed from between the leaves, two or three together, upon long petioles, and are of a yellow colour. The legume is about four inches in length. It is a native of the East Indies.

And the sixth has an annual root. The stem is from one to two feet in height; sometimes, but rarely, reaching three feet; it seldom stands upright, but is subdivided, round, and somewhat hirsute, delicate and slender. The branches are filiform, patulous, round, streaked, hirsute. The hairs ferruginous at the base. The leaves pinnate, alternate: leaflets sessile, alternate, minute, sickle-shaped, serrulate, three-nerved beneath, smooth on both sides. The petioles thicker at the base, round, hirsute. The stipules sickle-shaped above and below the petiole, opposite, acuminate, somewhat hirsute. The peduncles longer than the leaves, axillary, solitary, and erect. The flowers are pedicelled, alternate, whitish, or brownish yellow. The bractæ sessile, ovate-acuminate, serrate, streaked and hirsute at the edge. The cup has the upper lip serrate at the tip or bluntly three-toothed, and pubescent at the edge. The corolla, banner-streaked; wings obovate; keel ovate, sickle-shaped, upright and bifid. The legume almost upright, pendulous, margined, wrinkled and pubescent, linear-oblong, compressed, straight at the suture next the seeds, lobed and crenate on the other suture: joints six or seven, semi-orbicular, gibbous in the middle, compressed at the edge, separating spontaneously. The seeds are crescent-kidney-shaped, turgidly lenticular, smooth, shining and black.

This species is said to be somewhat sensitive; and during the night, or at the approach of rain, the leaves fold together in some degree. It is a native of the West Indies.

Culture.—The propagation of these plants may be accomplished by sowing the ripe seed on a moderate hot-bed, about the latter end of March or beginning of April; and when the plants have advanced to the height of two or three inches, and are become sufficiently strong, they must be transplanted out separately into small pots filled with light earth, and be immediately plunged into a new hot-bed, in order to promote their growth more effectually. Afterwards, as they advance in size, they should be carefully removed into larger pots: much attention is, however, necessary not to overpot them, as where this is the case the plants seldom thrive well.

The first species being tender requires considerable attention, in order to preserve it during the winter in this climate, by raising and keeping it in the hot-bed and stove bark-bed in the manner directed above; in which treatment it may be preserved in the winter, and afford flowers in the ensuing summer months.

The second, third and fourth sorts also demand a similar protection in the stove bark-bed

in the winter season; by which means they are made to flower more early in the succeeding summer, and the seeds become ripe in the autumn. And as their stems are of a succulent nature, they should be kept rather dry during the cold moist winter months, in order to prevent their roots from rotting. In this intention it is advised to put them into the bark-bed instead of the dry stove, as in the latter case, from the root-fibres becoming dry, the plants soon droop for want of moisture; and if it be supplied in that situation, the plants are quickly destroyed by the decaying of their roots.

The fifth and sixth species, from their being annual plants, require to be brought forward early in the year, in the same manner as the first kind, as where that is not the case they seldom perfect their seed.

These plants afford an agreeable and pleasing variety in stove and greenhouse collections.

ÆSCULUS, the *Horse Chesnut Tree*, a genus comprising several hardy trees of the deciduous kind, employed for the purpose of ornament.

It belongs to the class and order of *Heptandria Monogynia*, and ranks in the natural order of *Trihilatæ*.

Its characters are: that the calyx is a one-leaved, ventricose, small and five-toothed perianthium: the corolla consists of five roundish petals, plaited and waving about the edge, flat, spreading, with narrow claws inserted into the calyx, and irregularly coloured: the stamina have subulate, declining filaments, of the length of the corolla, and ascending anthers: the pistillum is a roundish germ, ending in a subulate style; the stigma acuminate: the pericarpium is a leathery, roundish, three-celled, three-valved capsule: the seeds are two, and subglobular.

The species are: 1. *Æ. Hippocastanum*, Common Horse Chesnut: 2. *Æ. flava*, Yellow-flowered Horse Chesnut: 3. *Æ. pavia*, Scarlet Horse Chesnut.

The first, or Common Horse Chesnut Tree, is sufficiently known by the beautiful parabolic form in which the branches are disposed, when it stands single; by its digitate leaves, which are composed of seven leaflets, serrate about the edge, the middle one largest, the outer ones smallest; and by its handsome, upright, pyramidal thyrses of white flowers, variegated with yellow or red towards the centre. Some of them towards the top of the thyrses being imperfect and abortive, they come out soon in the spring. The capsule, or nut as it is often termed, is divided internally into three cells according to some, but into two only, as others assert.

In this climate it rises to the height of fifty or sixty feet or more; and its leaves, which are large

and of a beautiful dark green colour, appear very early in the spring, the leaf-buds often beginning to swell out in January. It also forms its shoots in a very rapid manner, being often completed in the course of three weeks from the period of foliation; and which Miller asserts he has found a foot and a half in length with their leaves completely expanded. It is a native of Asia, and comes to this country from the Levant.

There are varieties of this tree cultivated, which have gold-striped and silver-striped leaves.

In the second species the leaves are digitate, having five leaflets; the laminas of the corolla being heart-shaped and roundish; the claws having twice the length of the calyx. This rises to nearly the same height as the former; but its flowers are of a yellow colour and appear later, as in May or June. It is a native of North Carolina in America.

The third, or Scarlet Horse Chesnut, rises to the height of about fifteen or twenty feet, but does not spread its branches to so great an extent as the former. The bark is smooth. The leaves are of a light green colour, standing opposite, and on long red petioles. The flowers are produced from the ends of the branches, upon long naked peduncles, each sustaining four or five flowers: these are much smaller than in the common sort, wholly red, tubulous without any brims, opening a little at the top, where the stamina appear, being seven or eight in number, terminated by roundish antheræ. They appear in June, and are sometimes succeeded by fruit in this climate: but the seeds rarely ripen. It grows naturally in Brazil, Japan, and several parts of the East.

Culture.—In the propagation and culture of these trees there is but little difficulty where the soil is suitable.

The first sort, or Common Horse Chesnut, will grow in different kinds of soil; but it succeeds with the greatest certainty, and in the most complete manner, in the deep loamy kinds, where the bottom is dry. It does not thrive well where the soils are in any great degree retentive of moisture, as in those of the marshy description. And in bleak exposed situations, and where the soil is thin and light, it is raised with much difficulty and trouble.

When it is cultivated on such soils as are in a slight degree inclined to moisture, the foliage, however, preserves its verdure much longer than when it is grown on lands that are very dry and porous.

It is mostly raised from the seed or nut, which should either be bedded in, or planted in drills to the depth of two or three inches, and half a foot or more distant in the rows, on spots of

good earth; the most proper season for performing which is as early as possible in the beginning of the year, as the latter end of January or beginning of February. The nuts should be preserved in sand during the winter, in order to prevent their contracting any mouldiness, and being thereby injured. When planted in autumn they are not only in danger of being destroyed by rotting, but from the attacks of vermin.

The young plants mostly appear in the latter end of April or beginning of May, and advance so quickly in their growth during the summer, as to be ready for transplanting in the autumn or following spring, about February or March. This should be performed in rows at the distance of three feet from each other, the plants being set at the distance of one foot from each other in the rows. In thus removing them, the roots should not be too closely cut over. They may then continue in the same situation for the space of two years, when they will be in a proper condition for being finally planted out; as when they are set out while young they mostly grow to a larger size. In this removal the plants should be taken up with great care, and the roots be touched as little as possible by the knife, except such parts as are bruised, as the trees seldom succeed well where the roots are much cut. If they are intended for large plantations they may, however, remain in their situations till they have attained a larger size. In either case the holes in which they are planted should be large, the top part of the roots being left nearly on a level with the surface of the ground, the fibres of which should be spread out and lapped in the fine mold that is well wrought to the bottoms. They should afterwards be staked and fenced in from cattle. October in dry soils, and February and March in moist ones, are the best seasons for this business.

The varieties of this tree with striped leaves are to be propagated either by layering, budding, or ingrafting them upon stocks of the common kind. For the first of these methods the autumn is the most proper season, but the latter may be best executed during the spring months.

The second and third kinds are likewise capable of being propagated by means of the nuts, which, as they seldom attain a perfect degree of maturity or ripeness in this climate, should be procured from the places where the trees grow naturally. They are then to be planted in pots of good earth in the early spring months, and immediately afterwards plunged in a hot-bed of a moderate temperature, air being freely admitted, by which their germination and early growth will be greatly forwarded. About the latter end

of May, or the beginning of June, the pots should be removed from this situation and placed up to their tops in the open ground, on a bed or border which has a southern aspect, water being occasionally given them in dry weather, in order to promote their growth as much as possible before the autumn. And as at this last season the plants, from their not being capable of resisting cold while young, are liable to be greatly injured or destroyed by the effects of the early frosts on their top buds, they should be carefully sheltered by some sort of thin covering. In the early part of the following spring they should be carefully taken up, separated, and planted out in a warm situation, at the distance of a foot from each other in every direction, and during the severity of the ensuing winter be carefully protected in the same manner as before. After this they generally become so hardy as not to require any further protection in the winter months. Where the practice of merely setting the nuts in borders of good light earth in unexposed situations, and removing them to spots of ground of the same nature in the following spring, to remain till they have acquired sufficient strength to be finally planted, is adopted, many of the plants are liable to be destroyed.

As the nuts or seed of these trees are frequently obtained with difficulty, the plants are often propagated, especially in nursery grounds, by budding or grafting them upon stocks of the Common Horse Chesnut; but in this way, as the stocks greatly outgrow the buds or grafts, the trees are neither so durable in their growth nor have so handsome an appearance.

It is observed in the new edition of Miller's Dictionary, by Professor Martyn, that the shoots in the first species, as has been already mentioned, are not only made with great rapidity, but that immediately on the falling of their flowers the buds at the extremities of the new shoots are formed for the ensuing year, and continue to swell out and enlarge till the autumn; at which season the covers that infold them are coated over by a thick tenacious juice, that serves to defend them from the prejudicial effects of frost and rain in the winter; and which, as the weather becomes warm in the spring months, dissolves and runs off, leaving them at full liberty to expand themselves, without ever hardening so as to impede the process.

This affords a sufficient reason for never touching the young shoots or branches of the trees by the pruning-knife, as where that is the case the means of the future shoots are wholly prevented, and the beauty of the trees destroyed.

All the different species of the Horse Chesnut are, from the great regularity of their form, and

the beauty of their leaves and flowers, well suited for the purposes of ornamental planting in extensive parks, lawns, and other pleasure grounds. When placed singly in open spacious grounds, considerably detached, or in clumps of two, three, or more, interspersed with other trees of similar growth, they produce a fine effect, and afford considerable variety. And in very extensive plantations, a tree or two of this sort may be occasionally introduced towards the fronts with great propriety and effect. In avenues or walks of considerable length, it may likewise be thinly employed in assemblage with the Lime, Maple, Spanish Chesnut, and other trees that afford much shade from the thickness of their foliage: but when planted regularly in rows, without being blended with trees of other kinds, as was formerly the practice, from standing too close it seldom retains its leaves or flowers well, and of course much of its ornamental effect is lost.—This circumstance also renders it improper for the purpose of forming a close shade where more than one tree is requisite; but where it stands alone it is capable of producing much shade.

For the purposes of timber it is not a tree of much value, though it may be made use of in various ways by the turner, as well as for being bored for water pipes, as its wood is durable when laid in the ground. But as it is a quick grower, it may be occasionally introduced in plantations of the timber kind.

As an ornamental tree, it has been much objected to on account of its leaves falling at an early period in the autumn, and producing much litter. It may also be an objection to it, in exposed situations and late climates, that from its producing its buds and flowers very early in the spring, it may frequently be liable to be so much checked by the frosts as to be in some measure prevented from flowering.

The Yellow- and Scarlet-flowered species are so highly ornamental as to deserve introduction in almost every kind of pleasure ground, in the borders, clumps, and other compartments of which they should always be placed towards the fronts, in such an arrangement with the other trees and shrubs as that the full effect of their yellow and scarlet flowers may be produced, and at the same time the greatest possible variety be afforded.

AFRICAN MARYGOLD. See TAGETES.

AGAPANTHUS, a genus comprehending the *African Lily*.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that the calyx is a spathe common, gaping at the side: the co-

rolla is one-petalled, funnel-shaped, and regular; the tube cornered, as if composed of six claws; the border six-parted, with the parts oblong and spreading: the stamina are six filaments inserted into the throat, shorter than the corolla, declinate: the antheræ are kidney-shaped and incumbent: the pistillum is a superior germ, oblong, three-cornered; the style filiform, of the length of the stamina, and declinate; the stigma simple or trifid: the pericarpium is an oblong capsule, three-sided, three-celled, three-valved: valves navicular, with contrary *dissepiment*: the seeds numerous, oblong, compressed, and enlarged with a membrane.

There is only one species, the *A. umbellatus*, African Blue, or Asphodel Lily.

It has the root composed of many thick fleshy fibres, diverging from the same head, striking deep into the ground, and putting out many smaller fibres, which are of a white colour and fleshy. From the same head arises a cluster of leaves surrounding each other at the base, so as to form a kind of herbaceous stalk about three inches in height, from which the leaves spread only two ways, appearing flat in the other two. The leaves are thick, succulent, about a foot long, and near an inch broad, compressed, and of a dark green colour. Between these comes out the flower-stalk, which is from two to three feet in height, round, and as large as a man's little finger, naked to the top, where it supports a large head or umbel of blue flowers, inclosed in a sheath, which splits into two parts, and is bent backward. Each flower stands on a pedicel about an inch long. The petals are blunt, and waved on their edges; the umbel being large, the flowers numerous, and of a bright blue colour, making a fine appearance.

They appear about the end of August, or the beginning of September, and frequently continue in full beauty till the spring.

It is a native of the Cape of Good Hope.

Culture.—This plant may be easily propagated by means of offsets taken from the parent plant. The operation of parting them is to be performed at the season when the process of vegetation is in the most languid state, which in this plant is generally about the latter end of June. In performing the work the old plants are to be turned out of their pots, and the mold cautiously cleared away from them, that the fibres of the offsets may be better ascertained. The offsets are then to be separated in such a manner as that their heads may not be injured. When they adhere very closely a knife may be employed for the purpose, being careful not to wound the bulb of either the old or new plant. After this has been accomplished the bulbs are to be planted

out separately, in pots of good garden mold, and placed in shady situations that admit the morning sun. A little water should be given once or twice a week when the season is dry, care being taken not to endanger the rotting of the roots by applying it in too large a proportion. In four or five weeks, when the new planted bulbs have put out fresh roots, they should be removed into other situations that are more fully exposed to the influence of the sun, a little more water being cautiously applied in order to strengthen their flowering. The flower-stems mostly appear in the beginning of September, and towards the end of it the flowers begin to open. At this period, if the season be not quite favourable, the plants must be brought under shelter, in order to protect them from the effects of frost or too much wet, care being taken to admit the air as freely as possible, as without this the flowers become pale, weak, and of a bad colour. About the end of October it is necessary to remove them to the greenhouse, and place them in such situations as that they may have the advantage of free air without being shaded by other plants. During the winter season, when the weather is mild, a little water may be given occasionally; but in case of frost it must be wholly omitted, the plants being kept as dry as possible.

The only management that plants of this sort demand is that of protection from the effects of frost and too much moisture; it is of course only necessary to shelter them in the house in the winter months, without the aid of artificial heat, and place them out in the open air in summer.

AGARICUS, a genus comprising the *Agaric* or Common Mushroom, and several other species of a poisonous quality.

It belongs to the class and order of *Cryptogamia Fungi*.

The characters of which are: that the *pileus*, or cap, has gills underneath; that the gills differ in substance from the rest of the plant, being composed of two laminae; and that the seeds are in the gills.

The species are very numerous, but there is only one that is proper for cultivation in the garden. This is the *A. campestris*, Common Red-gilled Mushroom, or Champignon.

It has the gills loose, in contact but not united with the stem, very thick set, some forked next the stem, some next the edge of the cap, some at both ends, and generally in that case excluding the intermediate smaller gills. The colour pink, changing to that of liver. The cap is white, changing to brown when old, and becoming scurfy, fleshy, regularly convex, but flat with age, and liquifying in decay. The flesh

is white; the diameter commonly from two to four, but sometimes nine inches. The stem is solid, from two to three inches high, and half an inch in diameter.

Culture.—There are two different methods employed in raising and propagating the Mushroom: the first or most usual one is that by means of the *spawn* or white fibrous radicles that afford the knobby material from which the mushroom is formed. The second is that by seed; in which the gills of the mushroom are cut out and deposited in the beds, or infused in water, and the beds afterwards well sprinkled over with it. This is, however, a less certain and convenient method than the preceding, and of course less frequently employed.

The situations in which this sort of culture is carried on are very different according to circumstances. It is sometimes attempted in the most dry, warm, and least elevated and exposed parts of the melon or cucumber grounds, or such quarters of the kitchen garden as are the most dry and warm; in which cases the beds should be formed on the surface of the ground, without any trench being dug, as in this way they are capable of being spawned more completely to the bottom, as well as that part more effectually preserved from the injurious effects of stagnant water in the winter season. Coverings of straw, thatch, or other litter, are applied for the purpose of protection. This method is, however, objected to by some as inconvenient, not only on account of the great difficulty and trouble of fully sheltering the beds during the severe winter months, but from the great destruction of the young plants that unavoidably occurs in covering and uncovering the beds in gathering the crops. It is therefore suggested by Mr. Nicol in his Scotch Forcing Gardener, that a frame constructed of half-inch feather-edged boards should be made in the form of the roof of a house to any suitable length, having the width of about six feet at the bottom. It should also have slides fixed in different parts, for the purpose of admitting air occasionally; and be very well painted or laid over with pitch, in order to guard against the effects of wet. It is to cover and protect the beds, being lifted off and on at pleasure by two persons; and in severe winters may be covered over with some material, as straw, litter, &c. so as to prevent the mushrooms or the spawn from being destroyed.

It is, however, a better method, where the mushroom is much wanted at different seasons of the year, to have compartments constructed for the purpose; or the back sheds of hot-houses, green-houses, cellars, and other similar places, may answer the intention perfectly well, little light or air being necessary.

At fig. 1. in the annexed plate is seen the representation of a mushroom-house of the first kind, wrought by one fire, but divided in such a manner as to produce the crops in succession. It should have a dry situation, and may be covered either by slate, tiles, or thatch. It is recommended by the author of the Scotch Forcing Gardener, who has found it well adapted to the purpose.

Mushrooms may, however, be raised under cover of a long range of glass-framing, erected either in the manner of a hot-house, or the top sloped both ways like the roof of a house, the slopes being of glass work; in which the bed is made, spawned, and covered with straw, litter, &c. as in the common method. This, from its being fully protected from the outward air, and all injuries from rain, snow, frost, and cutting weather of every kind, as well as always dry and warm, mostly proves successful.—Sometimes they are also cultivated in a similar glass frame, in which there is a pit like that of the hot-house, in which the bed is made in the manner of a common hot-bed, raised at top a little above the pit in a rounding form, on which the spawn is placed, earthed over, and then covered thickly with straw.

Nature, generation, and growth of the mushroom.—The mushroom in some measure partakes of both a vegetable and animal nature. In respect to the manner in which it is generated there are different opinions; but the more modern writers in general suppose it to proceed from seed, which is believed to be secreted in or between the gills, and that when the plants arrive to full growth, the head expanding almost flat becomes a large flap, which falls to the ground; and in that way disseminates the invisible seed to adjacent and distant soils and situations; where vegetating in its peculiar manner, it produces the white fibrous progeny called spawn, which is formed within the surface of the earth, or in dung, running and spreading in numerous thread-like strings, or radicle-fibres of a white colour, which produce a number of minute granulate knobs, or tubercles, of the same colour, which are the embryo plants, and which gradually increase into small round heads, enlarging quickly to the size of perfect mushrooms, effecting their growth more or less within the ground, and partly above it. Some accomplish a considerable growth within the earth, suddenly appear through the surface, and arrive to different-sized heads, frequently discovering themselves in a morning in places where there was no appearance of any in the preceding evening.

It is probably from the circumstance of the invisible seed, in the form of fine dust, being thus discharged on the ground and disseminated

by the air to various situations adapted to its nature, germinating and shooting forth for the production of new plants, that abundance of spawn and perfect mushrooms are frequently found in obscure places, where none were ever observed before: as in decayed dung hot-beds, horse-dung hills, dungy composts, and in bye dry places where horse stable dung has lain moderately dry for a considerable length of time undisturbed, and in a decayed condition; as well as in dry meadows and pasture lands.

In whatever manner the spawn is produced, it generates and increases rapidly, affording a plentiful propagation of mushrooms, by extending and spreading its stringy fibres in the earth or dung, according as it is obtained naturally or raised by culture, but especially in the latter method; as, when the pieces of spawny dung, &c. are planted into garden mushroom-beds, it runs and overspreads the whole just within the surface, as well as penetrates into the beds, and thus often yields a production of mushrooms in regular succession for several months; and after the produce declines, furnishes occasionally good fresh spawn in the interior parts of the dung-beds for future use. Maiden spawn, or that which was never worked in beds, or produced mushrooms, is in general to be preferred, as being more certain of producing abundant crops, and such as are more full and fleshy in their heads.

But although mushrooms grow spontaneously in meadows and grass pasture lands, they can be obtained only occasionally, and at particular seasons, as about the latter end of summer and in autumn, and not always of the wholesome eatable kind: but by garden culture they may be procured at any time of the year whenever they may be required, and always of a good kind both in substance and richness of flavour; and besides constantly procuring the proper dung spawn for planting, there is a greater certainty of their being of the genuine sort.

Culture by spawn, &c.—The common method of propagating and raising mushrooms in garden culture, is by planting, in the manner directed below, the lumps or pieces of spawny dung or earth in a sort of hot-bed made with horse-stable dung, formed on the ground in a long narrow ridge, both sides sloping like the roof or ridge of a house, to shoot off the wet, or rain and snow, &c. In this mode, when the great heat of the bed is abated to a very moderate degree, the spawn is inserted into both the sloping sides and the ends, as explained below, and the bed then earthed over about two inches thick; the whole being afterwards covered over with dry straw, or clean dry straw litter, laid a foot thick, to remain constantly night and day, in order to defend the bed effectually from the external air,

moisture and cold; as the spawn, being of a particular delicate nature, is equally impatient of extreme hot-bed heat, cold air, and of any considerable moisture, all of which are therefore to be carefully guarded against. By the mild heat of the bed obtained as above, the spawn is set in motion, running and spreading itself in the earth and dung, so as in five or six weeks to produce mushrooms.

It is however a better and more certain method to have the beds for this purpose prepared in houses, sheds, or other protected situations, as explained above.

The true and proper spawn is discovered most commonly in the soils of decayed dung and dungy composts, in the manner explained above; and when genuine imparts a full smell of the mushroom.

Of this sort of spawn it is proper to procure a supply previous to making the bed, in order more readily to judge of the extent of bed that may be necessary; especially as in some places good spawn is difficult to be obtained in any considerable quantity. It should be carefully collected, taking the lumps of spawny dung entire, and then depositing them in some dry place till they are wanted. The quantity which is proper may in general be at the rate of two or three bushels for a bed of twenty feet in length, and in the same proportion for those of larger sizes.

Mushroom spawn is found in various situations and soils, but more particularly in such as have been mentioned above. In collecting this substance, old dung-hills of horse-dung, &c. dungy compost heaps, stable-yards, where lays of horse-dung have been for some time in a state of decay, especially the dry corners or sides next walls, &c. as also horse-rides under cover, in public livery-stable-yards, that are thickly littered with short stable-dung, should be searched, as they often contain excellent virgin spawn.

In removing decayed dung hot-beds, old mushroom beds, &c. great plenty of excellent spawn may often also be procured; and sometimes in kitchen gardens, where the ground has been thickly dunged in the spring with dryish half-rotted dung, on digging the same ground again in autumn, &c. and looking with care, good lumps of spawn may be seen in the remaining unexhausted dung, and in the clods of mellow dungy earth.

In procuring spawn from grass pastures, it may be found in the earth where mushrooms have been observed to rise, by digging it up in lumps, and may be used where a sufficiency of dung spawn cannot be obtained; but where enough of the latter can be procured, it is to

be preferred to that of the field, for garden culture.

It has been remarked, that where mushroom spawn is obtained from places where the dung happens to consist principally of that from stone-horse stables, it is of a stronger quality than that of the common horse-dung; and, in its culture, more productive in large thick fleshy heads, and continues longer in production in the same-bed.

The cultivators of mushrooms near large towns, where vast quantities are raised for sale, generally prefer what they call virgin or maiden spawn, to such as has never been worked or produced mushrooms, and that has not been generated from old beds, as possessing greater vigour in its cultivated growth, and affording a more certain and superior production.

It is sometimes produced by art in composts formed of a quantity of horse-stable dung, of very moderate heat. The shortest moist parts, and as much of the dunging of the horses as possible, should be used, the whole being mixed with some rich mellow earth, or if of a loamy kind, the better; and deposited under the protection of some covered shed, or other place, the mass being closely covered with dry litter: the spawn in this way is sometimes formed in the compost in the course of six or eight weeks.

Spawn is likewise produced by procuring a quantity of full-grown mushrooms, cutting them to pieces, or only detaching the gills, and depositing them into composts as above, or at once strewing them over the surface of the regular beds, earthing them over, and covering them with straw litter.

The best season for finding natural spawn in plenty and perfection, is the autumn and early part of winter, while in full vigour, after the preceding summer's production; though good spawn is occasionally met with at all times of the year, and may be collected accordingly: it is most advisable, however, to procure the general necessary supply in the above seasons; for, spawn being of a singular nature, and liable to perish or be greatly injured by much wet and cold, it should be carefully collected in proper time, before it is weakened by the inclemency of the weather; as it is of much importance to have it in full vigour. If it be in a tolerably dry state, it may be immediately used for spawning such beds as are ready for its reception: but if rather moist, it should remain under cover a few days, to dry a little.

In collecting it, care should be taken to have the lumps or cakes of the spawnly dung, &c. in which it appears, taken up entire, laying them in a basket or wheel-barrow, and carrying them into some dry close shed, or other apartment, to be

deposited securely from wet, cold, &c. previously examining whether any of the lumps be wet; in which case, spread them to dry a little: and if not immediately wanted, let the whole be placed closely together in a warm dry corner, or put in hampers or sacks; and be closely covered with straw, or dry long litter, or garden mats, till wanted for spawning the beds. In this way its vegetative power may be long retained; and, if necessary, may be safely sent to any distance, as is often the case in places where a sufficiency cannot be procured at the time when wanted.

Where great quantities of mushrooms are raised, and consequently considerable supplies of spawn required, there are mostly mushroom-men who, at the proper season, go about collecting, both in town and country, the true sort, which they dispose of by the bushel, at from half a crown to five or six shillings, according to its goodness, and the ease with which it is obtained.

There is a variety of the mushroom termed White Cup, which rises with a small, thin, white head, without any material fleshy part, the spawn of which is entirely useless. It is distinguished by its very fine silky or cobweb-like nature, and exquisitely white hoary appearance, closely spreading in the spawnly lumps, and emitting scarcely any smell of the mushroom.

Constructing the beds.—In the production of this crop much depends upon the proper construction of the beds. The best season for making the principal ones, for the winter and spring production, is the autumn and beginning of winter. The autumn beds may be prepared about the middle or latter end of August, or any time in September, and occasionally till the middle or end of October; as in this season the spawn can be had in the best perfection and abundance, and the beds be made and prepared for the spawn to better advantage than later, when cold wet weather prevails; and the spawn will work sooner, and afford a more speedy and abundant crop during the winter: but beds for successional production, or where unavoidably omitted in autumn, may be made in November, or even as late as December.

The most suitable material for this purpose is horse-stable dung, which, as it heats too much at first for the growth of mushroom spawn, should always be prepared before it is worked up into the bed, in order to reduce it to a more moderate temperature, by forking it well up together in a heap for a week or two, and turning it over once or twice, that the rank burning steam may sooner and more effectually evaporate, before it heats in too great a degree: a quantity of the best moderately fresh dung should be procured,

proportioned to the size or extent of the bed, as at the rate of about three or four large cart-loads for a bed of twenty feet long. Some prefer the droppings of well fed horses only, for this purpose.

In regard to the dimensions of mushroom beds, they may be made of almost any extent in length, from ten feet to fifty or more, according to the quantity of mushrooms required; and from three feet to three and a half or four feet wide at the bottom, both sides gradually narrowed in a sloping manner upwards, till meeting together in a ridge at top, about three and a half or four feet high perpendicularly; which allows for settling to three and a half or less: the ridge-form is the most necessary to preserve the bed and spawn always effectually dry, which is very material in this culture. Besides, the sloping sides more quickly discharge the rain and snow, as well as afford the largest surface for spawning, and of course furnish a greater production. A single bed, of from ten or fifteen to twenty or thirty feet in length, may be sufficient for a small or middling family; and where the demand is more considerable, a greater number of beds may be prepared.

When the beds are made on the surface of the ground, first mark out the width and length of them; and if two or more are intended, they may be ranged parallel to each other, six or eight feet asunder.

In making the bed let the dung, prepared as advised above, be wheeled in, both long and short together, and with a light fork form the foundation of the bed, by shaking some of the longest dung evenly all along the bottom, four or five inches thick: then take the dung as it occurs, and work it into the bed, forming it at first to the full width, and gradually narrow it upwards, by drawing-in each side in a regular manner; and in advancing in length, raise it gradually into the ridge-form, to the full height, continuing it along regularly in the same manner and proportion; making the middle and sides equally full, beating the dung in firmly with the fork from time to time, as applied on the bed. Care should be taken to form both sides of an equal slope, the end being also equally sloped.

After the bed has been thus made, it must be permitted to remain some time, as a week, fortnight, three weeks, or more, till the first great heat has subsided, and the bed is reduced to a degree of mild heat proper for the spawn to be planted in, being kept during this interval fully exposed to the open air, day and night; and in case of excessive rains some dry long straw-litter should be thrown at the top, or thick garden mats spread over it, so as to shoot off as

much of the wet as possible, lest it either retard the heat, or occasion it to increase too violently. The operation of the heat, both in its increasing and decreasing state, should always be carefully attended to, as much depends upon the spawn being kept at a proper state of heat. In order to direct this, some long sharp-pointed sticks may be thrust down, in different parts, into the dung; and by drawing them up occasionally, and feeling them in the hand, a judgment may be more readily made of the state of the heat in the bed. The spawn should, however, be inserted as soon as the bed discovers a proper state of heat, and while it remains of a moderate lively temperature.

Others advise that these beds should be made on dry ground, and that the dung should be laid upon the surface; the width of them at bottom being about two feet and a half or three feet; the length in proportion to the quantity of mushrooms desired: then the dung should be laid about a foot thick, covering it about four inches with strong earth. Upon this bed more dung is laid, about ten inches thick; then another layer of earth, still drawing in the sides of the bed so as to form it like the ridge of a house, which may be done by three layers of dung and as many of earth.

The author of the Scotch Forcing Gardener, however, constructs his beds in this manner: he first lays about a foot in thickness of furnace ashes, brick-bats, or stone-chips, as a bottom, then six inches of rich horse-droppings, taken carefully from the stable every morning, and kept as whole as possible: these he suffers not in anywise to heat; and the whole time the bed is in preparation he exposes it to all the air in his power, provided it is perfectly dry. After this course has lain ten or twelve days, is quite dry, and there is no apprehension of its fermenting, he covers it to the thickness of two inches, with half vegetable mould of decayed tree leaves, and half light sandy loam, which should previously be well mixed together. Another course of droppings is then laid on as above, and, when it is also perfectly dry and past fermentation, covered with the same kind of mould as before. A third course of droppings and mould afterwards applied in the same manner finishes the bed. In the making, it should be gently rounded in the middle, especially if out of doors, in order to better carry off the wet. In this way the bed is generally a month or five weeks in making, and in as much more begins to produce, unless the weather or state of the droppings have been unfavourable. It is obvious, he says, that from the above mode of proceeding, a whole course of droppings cannot be laid on at once, unless there are a vast many horses, or the bed is of trifling

dimensions: of course, when the last end of the bed is covered, proceed with the first, when in a proper state, a second time, covering it with mould as it advances.

Spawning the beds.—The beds being brought to a suitable state of heat for the reception of the spawn, proceed to planting it, having previously seen that it is somewhat dry. The spawn, and lumps or pieces of dung in which it is contained, are to be planted together, after breaking and dividing the large cakes, or lumps, into moderately small pieces, in the sloping sides and ends of the beds, in some of the following methods: as either by putting them into the dung just within the surface, and earthing them over an inch or two thick; on the surface of the dung, and earthed over; or by first earthing the bed an inch or two in thickness, and then spawning in the earth, adding an inch depth more over the whole.

In the first method, or that of *spawning in the dung*; the spawn, after being divided as above, is deposited just within the dung, at small distances, in rows the whole length of the bed; beginning the first row within half a foot of the bottom, and making a small aperture for each piece, by gently raising the dung with one hand, whilst with the other the piece of spawn is inserted; turning the dung down upon it close afterwards: proceeding in the same manner with the rest, at five or six inches distance in the rows, and the rows six or eight inches apart, a little more or less, according to the supply of spawn: when any pieces of spawn are very small, two, three, or more may be planted together in a place: thus advance in spawning both sides, and each end; after which, let the small crumbs remaining at last be laid evenly along upon the top; which finishes the business. Immediately smooth both sides and the ends of the bed with the back of a spade evenly, in order to fix and close the surface of the dung upon the spawn. The bed is then ready for earthing.

In beds of considerable extent, which retain the heat longer than those of smaller dimensions, it may be sometimes necessary to delay the earthing several days, or a week, or more, after being spawned, if doubtful of their renewing too violent a heat by immediately covering them closely.

The most proper earth for this purpose is good, rich, mellow garden earth, moderately light and dry; or where that of a light, mellow, loamy nature can be procured, either alone or mixed with other rich good earth, it will prove of still greater advantage in promoting the production of the mushrooms in size and substance. The earth being well broken down with the spade, and made free from clods and stones, apply the casing, or coat of earth, first along the bottom of

the bed, about an inch and a half to two inches thick, continuing it the same thickness regularly up the sides quite to the top of the bed, beating it lightly down with the back of the spade in laying it on; proceeding regularly over each side, the ends, and the top, smoothing the whole in a neat manner. After this the beds are ready for the straw covering.

The second mode, or that of *spawning on the surface*, often proves very successful in obtaining a forward and plentiful production, as the spawn, if in plenty, may be laid tolerably close together, over the surface of the dung, and earthed over two inches in thickness. The spawning should be begun close down along the bottom, in a row longitudinally; placing the pieces of spawn flat-ways upon the dung, closer or wider asunder according to the supply. This is to be earthed over two inches thick, and about six or eight inches up the bed the same thickness: then proceeding with another layer upwards, deposit the spawn, in the same manner as before, upon the dung, close along the upper edge of the first covering of earth, which supports it from slipping down; earthing this row over as the preceding, and then another course of spawn in the same manner earthed as the other; proceeding thus upwards along both sides and ends to the top of the bed.

The practice of *spawning in the earth* is effected by having the bed first earthed over, and the spawn afterwards inserted into it. In this case the pieces of spawn are inserted into the earth close down to the dung, at small distances, in a regular manner, equally over the bed, on both sides and ends from the bottom to the top, as in the two foregoing methods; and when thus finished, directly add a thin coat of fine earth about an inch thick, over the whole, smoothing it down light and evenly with a spade.

Protecting the beds, &c.—After the beds have been thus spawned, they must be covered with straw or litter to a considerable thickness, in order to defend them from the external air, and the effects of rain, snow, and cold, for which the same method of covering is applicable, and may be applied, either directly, or soon after the bed is spawned and finally earthed over, if the heat is then moderate: or if it be thought that immediate covering may renew too fierce a heat, it may be deferred a few days when the weather is dry and mild, but should always be done as soon as the heat of the beds will admit.

Clean straw, or long dry stable litter, are the proper materials for this use, either of which may be applied about half a foot thick at first, and gradually increased to double that thickness, so as to defend the beds effectually and preserve a kindly

growing warmth in them. This covering is to be shaken on lightly and regularly from the bottom, up both sides and ends and over the top, and should remain on day and night: it is also useful, in very rainy weather and during the winter, to spread some large thick garden mats all over the straw covering, which secure it better from being displaced by wind, and shoot off rain and snow, before they penetrate greatly, or get through to the beds. If, however, they have at any time penetrated much through the coverings, so that the litter next the beds is considerably wet, that part of it should be removed as soon as possible, and dry straw be applied in its place next the beds.

The beds should be very little exposed to the full air, especially in cold weather, except just to gather the produce; or occasionally, when it has received too much wet, in order to dry the surface for an hour or two in a dry mild day; or to remove decayed litter next the bed, till fresh is added in its stead; or sometimes in fine warm weather, in spring and summer, to have the benefit of a very gentle warm shower for a short time.

After management of the produce.—After the beds have been spawned and covered in about a month, the first production generally begins to appear, if the bed and spawn work kindly, though it is sometimes longer: at this time begin to examine the progress of the beds by turning up some of the coverings; and if successful, the running and knitting of the spawn may be seen; and, probably, some mushrooms be advanced to a proper size for gathering.

In gathering the mushrooms, choose, if possible, dry weather, during the cold seasons, when turn off the coverings from one side of the beds first; but, if the weather be mild and warm, uncover the whole at once; then looking carefully over the surface, gather all that appear above the size of middling round buttons, detaching them with a gentle twist of the hand, head and stem together, being careful not to disturb the younger growths which are advancing just within or above the surface of the earth; no part being left in the beds, as they would rot, become maggoty, and detrimentally infect the succeeding young plants: nor, in gathering, should any be permitted to remain to become very large flaps, but the whole be gathered while of a close, firm, fleshy nature. As soon as the business is finished, let the beds be directly covered over again with litter and mats.

Beds thus advanced to production often afford two or three successional gatherings weekly, while in full perfection, for six or eight weeks, rising all over the beds, in different degrees of

growth; though, sometimes, a bed will continue double that time in tolerably good bearing, or even four, five, or six months: but the produce is not so quick or abundant as in the more early state of the bed. They may be examined once or twice a week.

The autumn-made beds generally produce mushrooms in a shorter time, and more abundantly, than those of other seasons.

It sometimes happens that mushroom beds remain several months after they are spawned, without affording any product; in this case, when, upon examination, the spawn appears in vigour, its fibres extended, and smells well, it should not be too hastily disturbed, as it often breaks forth into activity all at once, and furnishes considerable crops: or to assist such beds, if the heat appears greatly or quite declined, it may be proper to apply a sort of lining of warm stable litter over the whole, having first spread a coat of dry long litter immediately next the beds, shaking the warm litter a foot thick over that, which by its kindly warmth sometimes revives the inactive spawn into a state of vegetation.

In summer, when any of the beds are in production, if very hot weather, and the earth of the beds be very dry, it may be proper occasionally to open them, and give a moderate sprinkling of water; or sometimes to expose them to the benefit of a very moderate shower of rain for a short time, covering them up again soon.

In beds of considerable time standing, where any of the coverings decay or become dung, they should be removed, and fresh ones applied in their stead.

Where mushrooms are raised by means of heat, it is found that they succeed best when beds are regularly kept to about fifty-five degrees; and that air is of little use.

AGAVE, a genus comprehending plants of the Aloe kind, as the *Great American Aloe*, or *Agave*, &c. They are herbaceous, ever-green perennials of the succulent tribe, in general of considerable growth, and the tender exotic kind.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Coronarieæ*.

Its characters are: that it has no calyx; that the corolla is one-petalled, and funnel-shaped, with a six-parted equal border, and lanceolate erect parts: the stamina are filiform, erect filaments, longer than the corolla; the antheræ linear, shorter than the filaments, and versatile: the pistillum is an oblong germen, growing thinner towards both ends, inferior; the style filiform, of the length of the stamina, and three-cornered; the stigma headed and three-cornered: the pericarpium is an oblong, three-cornered,

three-celled, three-valved capsule, and the seeds are numerous.

There are several species: but those of most importance for the purpose of cultivation are, 1. *A. Americana*, Great American Agave; 2. *A. Virginica*, Great Virginian Agave; 3. *A. vivipara*, Viviparous or Childing Agave; 4. *A. foetida*, Fetid Agave; 5. *A. lurida*, Broad-leaved Vera Cruz Agave; 6. *A. tuberosa*, Tuberous-rooted Agave.

In the first sort, when vigorous, the stems generally rise to upwards of twenty feet in height, and branch out on every side, so as to form a kind of pyramid composed of greenish-yellow flowers, which stand erect, and come out in thick clusters at every joint. When these plants flower, they make a fine appearance, and continue a long time in beauty, if they are protected from the cold in autumn; as there will be a succession of new flowers produced for nearly three months in favourable seasons. It has been generally believed that this plant does not flower till it is a hundred years old; but this is a great mistake, as the time of its flowering depends on its growth: so that in hot countries, where it grows fast, and expands many leaves every season, it flowers in a few years; but in colder climates, where the growth is slow, it will be much longer before it shoots up a stem. The seeds do not come to maturity in this climate. It has been long preserved in gardens in this country, where, for many years past, there have been several of the plants in flower.

It has two varieties, that are in cultivation: the American Agave with gold-striped leaves, and the American Agave with silver-striped leaves.

Though plants of the common Agave have flowered in many different places, few of the variety with yellow-striped leaves have been yet seen in blow in this climate.

The second species has so much resemblance to the first, as not to be distinguished from it except by good judges. The principal differences are, that its leaves are narrower towards their extremities, and of a paler green colour: the stems do not rise so high, or branch in the same manner; and the flowers are collected into a close head at the top, but are of the same shape and colour. It seldom puts out so many offsets as the common kind. This grows to a large size.

The third species never rises to a large size: the leaves are seldom more than a foot and a half long, and about two inches and a half broad at their base; these end in a slender spine, being slightly indented on their edges; are also reflex, and of a dark green colour. The flower-stem

rises about twelve feet in height, and branches out towards the top, in the same manner as the fetid sort: the flowers are nearly of the same size and colour with that, and after they fall off are succeeded by young plants in the same manner: hence it has obtained the title of Childing Agave. As it never produces any suckers from the root, it cannot be increased till the time of flowering.

The fourth species has long, narrow, stiff leaves, of a pale green colour, not indented on their edges, but frequently a little waved: the side leaves spread open; but those in the centre fold closely over each other, and strictly surround the bud. It is seldom more than three feet high; but the flower-stem rises near twenty, and branches out much like that of the first, but more horizontally, forming a regular pyramidal head: the flowers are of the same shape, but smaller and of a greener colour. In a plant that flowered here, they were succeeded by young plants, on their dropping off in the spring, the old plant dying soon afterwards.

The fifth species has considerable resemblance to the first sort, but is of a much more moderate growth; and the leaves are much thinner, the indentures on their edges abundantly closer, and not so deep: the spines too are blacker. The difference in flower is not yet well ascertained, few having flowered in this climate.

There is a variety of this plant in which the leaves are very narrow, not exceeding an inch and a half or two inches in breadth, and a foot and a half to two and a half in length, being rigid, stiff, and entire; and are terminated by a stiff black spine; the outward ones spreading in a horizontal manner. It never throws out suckers.

The sixth species has the leaves indented on their edges, each indenture terminating in a spine: the root is thick, and swells close above the surface of the ground; but in other respects it agrees with the species described above. The plants never put out suckers from the roots. The fructification of these two last species is not well known.

The roots in all the sorts are of the fibrous thick fleshy kind, which spread considerably; and they are all natives of America.

Culture.—In the cultivation of these plants some care and attention is necessary. They are propagated in different methods, according to the differences in the habits of the plants; as by offsets, parting the roots, seed, and planting the small plants formed on the flower-stems. When seed is employed, it should be procured from abroad, as it does not come to perfection in this climate.

All the species, as they are extremely succulent in their nature, require to be planted in such earth

as is of a light, dry and sandy kind; otherwise the roots are liable to rot and decay in the winter season, and the plants to be destroyed.

In the first and second sorts, and their different varieties, as they are very productive of suckers or offsets, especially the first, the culture may be readily effected in that way. These should be taken off from the roots any time during the summer season, and be then planted out singly in pots filled with earth of the above kind, plunging them into a hot-bed the heat of which is very moderate, a little water being previously given them. In this method they readily take root, and become plants.

The third and fourth species, as they rarely, or ever, produce offsets from their roots, cannot be propagated in the above manner. This is to be accomplished by setting the young plants, produced on the flower-stems, in pots of light earth, of the kind just mentioned, at the time of their dropping off in the spring, and then placing them in a hot-bed which has a rather higher temperature than for those of the preceding kinds.

But as this mode can only be practised when the plants flower, which is very long before it happens, it must be very tedious and uncertain. Another method may therefore be attempted, which is that of raising them by planting, in the same manner as above, pieces split off from the roots; which may be performed at the time the plants are removed into fresh pots in the summer.

The fifth and sixth sorts may be propagated in a manner similar to the last; but, as they are more tender than the above species, especially the latter, more care will be requisite.

In the after culture of all the different species and varieties, it will constantly be necessary to retain them in pots or tubs, which, in the two first, with their respective varieties, and the fifth kind, may be exposed in the open air during the summer months; the last being, however, put out somewhat later in the spring, and taken into the greenhouse something earlier in the autumn, than the others.

But the last three species, from their being of a much more tender nature than the two first, must be constantly protected in the stove during the winter season in this climate, their growth being even considerably checked when placed out in the open air in the summer months. It is therefore the most advisable practice, to let them have a pretty free admission of air in this situation, during the continuance of the hot season.

Very little or no water should be given them in the winter months, but in the summer it may be very sparingly applied once or twice a week. By this means the roots may be preserved in a

healthy condition, and their leaves be free from the attacks of insects.

The plants must be shifted annually, or every second year, in the summer season, into pots of fresh earth of larger sizes, according to their growth, taking care that they be not too large, as the plants are never found to thrive well unless their roots be in some measure confined. See **SHIFTING OF PLANTS.**

Those species that are of large growth, as the first and second, may be best in tubs; and as they often arrive at such sizes as to be moved with great difficulty and inconvenience before they attain the flowering state, it may be necessary to have the tubs set upon wooden frames fixed on low wheels, in order to facilitate the business of removing them into and out of the greenhouse. And as on this account they not only take up much room, but are troublesome in their management, it may be sufficient to cultivate only one or two of such large sorts.

The disposition of these plants to flower may be discovered by the expansion of the central leaves, and the appearance of the bud from which the future stem is to proceed. In cases where its progress is very tardy, artificial heat may be sometimes had recourse to, in order to advance its growth more rapidly. For this purpose a pit of suitable dimensions may be dug out, in which a hot-bed of dung, or tanners bark and dung in mixture, may be formed and raised to the height of two or three feet. The pot or tub is then to be plunged into this bed, and the plant watered in the manner already recommended, due room being provided for the stem to rise in, if it be in a confined situation; but when in the open air a temporary covering should be made for its occasional protection against cold, &c.

It has been already observed to be a common opinion, that these plants do not arrive at the state of flowering in a shorter period than about one hundred years: this would seem, however, not to be regulated by length of time but the growth of the plant, which greatly depends on the warmth of the climate and other causes. As the flowering-stem comes out in the centre between the leaves that surround it closely and embrace each other, the coldness of this climate must necessarily retard the growth of the plant, by the unfolding of the leaves on which it so greatly depends being thereby much delayed, and of course the flowering of the plants be a work of considerable time. It often requires sixty, seventy, or even a greater number of years, before this expansion of the leaves has been effected; but when accomplished, the stems run up to their full growth with vast rapidity, often in the

course of two or three months. The economy of the plants is such, that they only flower once, but continue for some length of time; after which a complete dissolution of the plants takes place, in their roots, leaves, and stems.

All the different sorts are highly ornamental, both on account of their large singular leaves, and the extraordinary beauty of the flowers when they appear; the former being thick, fleshy, and erect; proceeding closely from the crowns of the roots in large clusters, and attaining different lengths according to the species, as from a foot and a half to six or eight feet, having the breadth of six or eight inches, with three or four in thickness, gradually decreasing in both the last to the extremities, where they terminate in thorny points: the latter in most of the species presenting themselves on branches proceeding from stems of great length on every side, in beautiful clusters of a pyramidal form and fine yellow colour, producing a grand effect.

The more hardy sorts are all well adapted for adorning lawns, courts, and other compartments in the immediate vicinity of the house, during the summer months, when placed out separately; as well as with the more tender and smaller kinds, to afford variety among the greenhouse and stove collections. The stripe-leaved varieties have a strikingly beautiful appearance in either situation.

The juice of the leaves of these plants, when expressed by bruising, and reduced to a proper consistence to be incorporated with some alkaline substance, has been found to answer as a substitute for soap in washing.

AGERATUM, a genus comprehending some plants of the herbaceous flowering annual kinds.

It belongs to the class and order of *Syngenesia Polygamia Æqualis*; and ranks in the natural order of *Compositæ Discoidææ*.

The characters of which are: that the common calyx is oblong, having many lanceolate subequal scales: the compound corolla uniform, with corollets, which are hermaphrodite, tubulous, numerous, equal, but scarcely longer than the calyx; proper-monopetalous, funnel-shaped, border quadrifid and spreading: the stamina are very short capillary filaments: the anthera cylindrical and tubular: the pistillum is an oblong germ: the style filiform, and of the length of the stamina: the stigmas two in number, very slender and erect: no pericarpium: calyx unchanged: the seed solitary, oblong, angular, being crowned with a chaffy, five-leaved, upright-awned calycul: the receptacle naked, convex, and very small.

The species are, 1. *A. conyzoides*, Hairy Ageratum; 2. *A. ciliare*.

In the first the root is annual: the stem woody, square, reddish, and of about a foot and a half in height. The leaves are opposite, hairy, much serrate about the edges, an inch and a half long, and three quarters of an inch broad, petioled, resembling those of the nettle. Calyx ovate-cylindric, with two or three rows of scales, which spread very much when ripe. The receptacle is ovate-globular, and pitted. The seeds are small, columnar, smooth, blackish, being elongated at the base into a little white swelling navel: crown the length of the seed, and white: leaflets membranaceous, ciliate-toothed, ending in a long rough bristle-shaped awn. It flowers in July and August, and is a native of Africa.

The second has the stem herbaceous, two feet high, upright, thick, brownish and branched. The leaves sharpish, veined, smooth, and opposite. The flowers terminate in a sort of umbel. The calyx is almost ovate. The corollets are five-cleft; the crown of the seeds having five cusps. It is a native of the East Indies.

Culture.—These plants are propagated by means of seed, which should be sown on a hot-bed of a moderate temperature, in a light fine mould. After the plants have become sufficiently strong, they should be transplanted into a second bed of the same kind, carefully watering and shading them until they have taken fresh root, when air should be pretty freely admitted when the season is warm.

About the beginning of June the plants may be gradually inured to the open air; and towards the middle of the same month transplanted into the situations where they are to remain in the open ground. The seeds become ripe about September.

As these plants are not of tall growth, and continue in flower for a considerable length of time, they may be planted in the anterior parts of the clumps and borders of pleasure grounds, where they may serve the purpose of ornament, and at the same time afford a suitable variety.

AGRIMONIA, a genus affording several herbaceous perennial plants of the *Agrimonia* kind.

It belongs to the class and order of *Dodecandria Digynia*, and ranks in the natural order of *Sciticosæ*.

Its characters are: that the calyx is a one-leaved, five-cleft, acute, small, superior, permanent perianthium, fenced with an outer calyx: the corolla has five flat, emarginate petals, with the claws narrow, inserted into the calyx: the stamina are capillary filaments, shorter than the corolla, inserted into the calyx; the antheræ small, twin, and compressed: the pistillum is a germ inferior; the styles simple, of

the length of the stamina: the stigmas obtuse: no pericarpium: the calyx contracted at the neck, and hardened: the seeds are two, and of a roundish form.

There are several species, but those that deserve to be cultivated as ornamental plants are,

1. *A. odorata*, Sweet-scented Agrimony;
2. *A. repens*, Creeping-rooted Agrimony;
3. *A. agrimonoides*, Three-leaved Agrimony.

The first sort rises to near four feet in height, the leaves having more pinnas than in either the common or white kinds; and they are also longer and narrower, ending in acute points: the serratures are sharper, and when handled they emit an agreeable odour. The flower-stems are branching, and the flowers stand on longer peduncles than in the common sort. It is a native of Italy.

The second species is of a more humble growth, seldom rising above two feet high: the pinnas of its leaves are longer and narrower than those of the former, and the spikes of flowers very short and thick. The roots spreading widely, it multiplies faster than the common sort: the seeds also are much larger and rougher. It much resembles the foregoing, but the stems are shorter, thicker, and hirsute: the stipules, being the length of the interstices, are reflected, and almost cover the whole stem, and the end-lobe is not pedicelled. The spike is short, dense, sessile, with bractæ the length of the flower.

In the third, the root-leaves are pinnate, with two or three pairs of pinnas, and smaller ones intermixed; the end-lobe larger than the others: the pinnas ovate, villous, and toothed: the stem-leaves are ternate: the bractæ ovate and acuminate: the flowers in corymbs; small, yellow, rarely six: the calyx is ten- or twelve-cleft: the petals ovate, obtuse: the stamina seldom more than eight, tender, yellow. This attains the height of about three feet. It is a native of Italy and Carniola.

Culture.—The cultivation of these plants requires no difficulty, as they are of a hardy nature, and thrive in almost any soil or situation. They may be readily propagated by parting the roots, which should be performed in the autumn, in order that the plants may be well established before the spring. As their roots spread extensively, they should not be planted out nearer together than two or three feet. They are likewise capable of being raised from seed, which should be put into the ground at the same season as in the other method; for where the sowing is deferred till the spring, there are seldom any plants produced that season. The first mode is, however, the most expeditious.

All the sorts may be found useful as plants of

ornament and variety, when placed in assemblage with those of other kinds, in beds and borders where various plants of easy culture are required. The first sort, besides the ornament which it affords by the tallness of its growth and the beauty of its flowers, is held in esteem for the fragrance which is emitted from its leaves, flowers, and other parts.

As these plants, though perennial in root, are only annual in the stems, they should be cut off and cleared away every autumn, as soon as they have perfected their seed.

AGROSTEMMA, *Wild Lychnis* or *Rose Campion*. The plants of this genus are of the hardy herbaceous, annual, and biennial-perennial kinds.

It belongs to the class and order of *Decandria Pentagynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a one-leaved, coriaceous, or leather-like, tubulous, five-toothed, permanent perianthium: the corolla has five petals, with claws of the length of the tube of the calyx; and border spreading, obtuse, and undivided: the stamina are ten awl-shaped filaments, five alternately later than the other five, inserted into each claw of the petals: the antheræ simple: the pistillum is an ovate germ, with filiform, erect styles, of the length of the stamina, and simple stigmas: the pericarpium an oblong-ovate, covered, one-celled, five-valved capsule: the seeds are very numerous, kidney-shaped, and dotted: the receptacles free, as many as seeds; the interior ones gradually longer.

There are a number of different species, but those for cultivation as ornamental plants are, 1. *A. coronaria*, Rose Campion: 2. *A. Flos Jovis*, Umbellate Rose Campion.

The first of these species, in its natural state, has the corolla white, with the middle red; and it has the habit of the species below, but is harder, more pulpy, and more tomentose. The calyxes are much harder, callous, and covered with a white pile, with hard thick ribs, not green hairy lines as in that: the petals are much broader, slightly emarginate: the auricles bifid: the flowers not heaped into an umbel, but scattered on the branches of the stem on very long peduncles. Native of Italy and the Valais.

There are three varieties of this plant: one with deep red, another with flesh-coloured, and a third with white flowers: and the Double Rose Campion, with a large crimson flower, which is chiefly cultivated as being an elegant and beautiful flower.

In the second, the stem is erect, dichotomous at the top, and covered with a white nap. The leaves are conjugate, connate, ovate-lanceolate, quite entire, erect, and pressed to the stem, being

all over nappy. The flowers from the top and forks, solitary. The flower-stem rises near a foot or a foot and a half high, and the flowers grow in umbels on the top of the stalk, and are of a bright red colour. It flowers in July, and the seeds ripen in September. It is a native of the mountains of Switzerland.

Culture.—In cultivating these plants all the single kinds may be easily propagated by the seeds, which may be sown either in the spring or autumn on a bed of common earth; and after the plants have attained the height of about three inches, they should be pricked out into another bed, at the distance of six or seven inches from each other, water being immediately applied in not too large a quantity, and afterwards occasionally repeated. In the autumn or spring following the plants will be in a proper situation to be transplanted into the places where they are to remain for the purpose of flowering in the ensuing summer months. And as the plants frequently come up from the self-sown seeds with equal strength and vigour, these may be transplanted in the same manner, and often succeed fully as well.

As the double sorts afford no seed, they can only be propagated by parting the roots; which, as they mostly afford abundance of offsets, may be easily effected. This should be performed in the autumn, as soon as the flowering is over, every head being parted that can be slipped off with roots. These should then be planted out in fresh ground that has not lately received any manure, at the distance of six or seven inches from each other; water being applied in a sparing manner until they have taken fresh root, after which it must be wholly omitted, as much moisture is very prejudicial. In the spring they should be put into the situations where they are to remain for flowering.

A few plants may likewise be placed in pots of good fresh mould, in order to be set out in the yards or other compartments about the house.

The second sort admits of the same methods of cultivation, but succeeds best in a rather moist soil, where the situation is somewhat shady.

Both the species and all varieties are well suited for the purposes of ornament, affording a very agreeable diversity in clumps and borders.

AILANTHUS, a genus comprising a tree of the hardy exotic kind, and of lofty growth.

It belongs to the class and order of *Polygamia Monœcia*.

Its characters are: that it has male and female hermaphrodite flowers: the calyx of the male is a one-leaved, five-parted, very small perianthium: the corolla has five petals, lanceolate, acute, convolute at the base, and spreading: the stamina

have ten filaments, compressed, of the length of the corolla: the antheræ are oblong and versatile: the calyx of the female is like that of the male, permanent; the corolla the same: the pistillum has from three to five germs, curved inwards: the styles are lateral, and the stigmas capitate: the pericarpium has as many capsules as there are germs, compressed, membranaceous, sabre-shaped, acute, on one of the edges emarginate: the seeds are solitary, lens-shaped, bony, close to the emarginature: the calyx of the hermaphrodite is the same with that of the male and female: the corolla the same as in the male: the stamina have two or three filaments, as in the male: the pistillum, pericarpium and seed as in the female.

There is only one known species, which is the *A. glandulosus*, or Tall Ailanthus.

It rises with a straight trunk to the height of forty or fifty feet: the bark is gray, slightly furrowed, and has white marks on it: the young twigs are covered with a fine velvet down. The leaves are large, smooth, alternate, unequally pinnate, and disposed horizontally. The common petioles form an angle more or less acute, or sometimes a right one with the branch: they are slender, and from one to two feet in length. The leaflets are from twenty to thirty, alternate and opposite, from two to three inches in length, and from one to two in breadth, standing on a short petiolule; and laterally towards the base are some blunt teeth glandulose beneath: the rest of the leaflet is commonly entire. The flowers are of a white colour, very numerous in a close terminating panicle, usually in groups on a common peduncle, each flower being on its proper pedicel: they are male and female, with a few hermaphrodites: the males are the most numerous. A disagreeable odour is said to issue from the flowers. It was supposed to be a species of *Rhus*, before the nature of its fructification was understood. It is a native of China.

In this climate it has yet produced only male flowers; but in France and Holland it has borne female flowers and fruit: the latter, however, has not ripened. Some years it bears only male flowers; but in France, about twice in ten years, it has produced both male and female flowers.

Culture.—In the propagation of this tree, the best and most easy method is that by the young plants which proceed from the root near to the surface of the ground. These should be taken up in the early part of the spring, and then be planted out in good land, in an open exposure, at the distance of a foot or eighteen inches from each other, where they may remain for two or three years. They may afterwards be transplanted into the proper situations.

They may likewise be raised by cutting some of the smaller roots, and then turning them up.

It is a tree that grows very fast in this climate, and from its being handsome, and rising to a considerable height, is proper for ornamental plantations, or large clumps in pleasure grounds. If the bark be wounded, a resinous substance issues from it, which soon hardens. Its wood is hard, heavy, glossy like satin, and susceptible of taking a very fine polish. It may of course be made use of for various purposes.

AIR, when considered in respect to vegetation, is the thin medium which surrounds, and becomes intermixed with, the particles of the soil; and in this way, as well as by being absorbed and taken up by the organs of plants, contributes in a great measure to their health, growth, and support.

It is a substance possessed of weight or gravity, and capable of being compressed; but not condensable in the heat of the atmosphere without combination. Without the aid of this medium, vegetables could not live, fire be maintained, or heat generated. But though the atmosphere be the vast laboratory in which nature performs various operations, solutions, precipitations, and combinations, and the grand receiver in which all the attenuated and volatilized productions of terrestrial bodies are lodged, mingled, agitated, combined, and separated; still the air is the same in respect to its qualities, being decidedly characterized by the two properties of supporting respiration and combustion. This is sufficiently evident from combustible bodies not being burnt without the contact of atmospheric air, as in *vacuo* this process does not take place. From respiration and combustion not continuing beyond a certain length of time in a given quantity of atmospheric air, it is likewise obvious that only a part of the air that surrounds the earth is proper for the support of either animal or vegetable life, or combustion, the other being improper for these purposes. Hence it is evident that atmospheric air is a compound of two different sorts of air: the one supporting respiration and combustion, and on that account denominated *vital air*, *pure air*, or *oxygen*; the other injurious in these respects, but necessary in a certain proportion, in order to modify the too powerful action of vital air, or oxygen, in the respiration of animals: this is termed, from its properties, *azote* or *phlogisticated air*. One hundred parts of common or atmospheric air contain twenty-seven of the oxygenous or pure air, and seventy-three of the azotic or nitrogen air, as has been shown by the late experiments in chemistry.

Besides these principles, the common or atmospheric air also contains a proportion of *fixed*

air, or what is now termed *carbonic acid gas*, from carbonaceous matter, or charcoal, forming one of its constituent principles. The vital air, or oxygen, by combining with other bodies, produces different new compounds that may be of great utility in the vegetation of plants.

Long before the discoveries in modern chemistry had ascertained the constituent principles of common air, it had been remarked to be a principal agent in the vegetation of plants by Mr. Ray, in the Philosophical Transactions, who found that lettuce seed, which was sown in the glass receiver of the air-pump, exhausted and cleared from all air, grew not at all in eight days time: whereas some of the same seed, which was sown at the same time in the open air, had risen to the height of an inch and a half in that time: but on the air being let into the exhausted receiver the seed grew up to the height of two or three inches in the space of one week. The ingenious experiments that have been lately made by Mr. Gough, and detailed in the Transactions of the Manchester Philosophical Society, have still more clearly demonstrated, that the vegetation of most sorts of seeds depends in a great measure upon the presence of the oxygenous principle of the air. And another proof of the utility of air in vegetation is met with in the *Sedum*, which pushes out roots without earth or water, and lives several months. Some sorts of Aloes, if hung up in a room entirely secured from frosts, will remain fresh for some years, though they sensibly lose in their weight.

Air also operates within the earth, and, from the changes which it undergoes, and the new combinations that are formed in consequence of them, contributes greatly to promote the growth of plants.

Thus it has been observed by the author of the Philosophy of Gardening, that as most earths contain carbon, and other inflammable materials that are capable of uniting with oxygen, and by that means afford carbonic or other acids; as well as water which, by its decomposition when in contact with confined air, forms ammonia, or volatile alkali, by its hydrogen combining with azote, and nitre by the conjunction of its abundant oxygen with another portion of the abundant azote or nitrogen of the atmospheric air, there is good ground to conclude that the great utility of turning over the earth by the spade, may arise from the production of such effects, by the confining of the oxygen, as well as the azote or nitrogen, of the air in the pores among the particles of the mould: and as these effects must be produced more extensively and more readily, in proportion, as the particles of the earth are more perfectly broken down and

reduced, the advantage of frequent digging, or turning over the earth, in the practice of gardening, is rendered sufficiently evident.

Besides, as the heat of the air is given out in the union of oxygen with carbon, as is fully demonstrated by the heat that takes place in hot-beds; it would seem to show, that in the culture of roots or plants, the seeds and sets should be sown and put into the ground as soon as possible after the beds have been dug over, while the above processes are going on, and the heat is evolving, as by this means their vegetation and growth may be the most effectually promoted.

Air was considered by the learned Dr. Hales to be a fine elastic fluid, with particles of very different natures floating in it, whereby it was admirably fitted, by the great Author of nature, to be the breath or life of vegetables as well as animals, without which they could no more live and thrive than animals; and as a proof of the great quantities of it in vegetables, he refers to the third chapter of his excellent Treatise on Vegetable Statics, where he remarks, in the experiments on vines, that a great quantity of air was visible, which was continually ascending through the sap into the tubes; which manifestly shows what plenty of it is taken in by vegetables, and is perspired off with the sap through the leaves. He likewise details several experiments made on branches of apple, apricot, birch, and other trees, to prove the same thing.

And Dr. Grew remarks, that the pores are so large in the trunks of some plants, as in the better sort of thick walking-canes, that they are visible to a good eye without a glass: but with a glass the cane seems as if stuck at top full of holes with great pins, so large as very well to resemble the pores of the skin in the ends of the fingers and ball of the hand. In the leaves of pines he likewise observes, that by means of a glass they make a very elegant show, standing almost exactly in rank and file through the length of the leaves; whence he thinks it may be probable that the air enters plants, not only with the principal food or nourishment by the root, but also through the surface of their trunks and leaves, especially at night, when they are changed from a perspiring to a strongly imbibing state.

It is observed by the former of these writers, however, that in all the experiments he tried for this purpose, he found that the air entered very slowly at the bark of young shoots and branches, but much more freely through old bark; and that in different kinds of trees it had different degrees, or more or less freedom of entrance: and likewise that there is a portion of air both in an elastic and unelastic state, mixed with earthy

matter, as he found by several experiments which are detailed in his work.

Mr. Boyle also, in making experiments on air, among other discoveries, found that a good quantity of it was producible from vegetables, by putting grapes, plums, gooseberries, peas, and several other sorts of fruit and grain, into exhausted and unexhausted receivers, where they continued for several days, emitting great quantities of air. These led Dr. Hales to further researches on the subject, in order to discover what proportion of air he could obtain from the vegetables in which it was lodged and incorporated; and he concluded that it was abundant in vegetable substances, and bore a considerable part in them.

Some kinds of earth, as well as substances of the manure kind, are found to contain much larger proportions of air, and to yield or part with them with much greater ease and facility than others: a circumstance which has much influence in the practice of gardening, and the growth of different sorts of vegetables.

Numerous experiments that have been more recently made, have, however, in consequence of the knowledge that has been acquired of the constituent principles of the air, from the ingenious inquiries of Black, Cavendish, Priestley, and others in our own country, and the exertions of Lavoisier and other chemical philosophers on the continent, brought us more fully acquainted with the causes of the numerous beneficial effects that are daily produced on vegetation by the agency of the atmospheric air.

It has been ascertained, that both of the principles which constitute atmospheric air are highly beneficial in the economy of plants; and that by their different combinations with other matters they contribute greatly to vegetation, as has been already seen.

And it has been shown above, that the vegetative process of grain, seed, and other vegetables, is greatly promoted by the free and easy access of the air; which strongly enforces the necessity of pulverizing and rendering the soil in a state of considerable fineness before they are introduced into it. Seeds and plants can grow in the moisture of the air, and in water, without the intervention of earth; but neither of these is sufficient for the purpose without the free admission of air. Many plants of the succulent kind retain their vegetative quality a considerable length of time, merely by the agency of the air; and some emit roots from the branches that are cut from them, on being exposed to the air, without the assistance of either earth or water. The *Sedum* and *Sempervivum* afford examples of this kind. Air is likewise necessary in order to preserve the vegetative faculty of grains and seeds while they

are kept for the purposes of sowing, as is evinced by inclosing them in vessels closely stopped and prevented from receiving air; for under such circumstances their germinating property is found to be either completely destroyed or greatly impaired. On this account many sorts of grain and seeds may be considerably injured and retarded in their vegetation, by being deposited too deep in the ground. There are, however, many seeds which are able to retain this faculty, though for a long time buried deep in the soil, as is evident from their readily coming up on the earth being turned up to a great depth by the spade or other means.

A free exposure to the action of the air is also requisite for the vigorous growth of trees, shrubs, and culinary vegetables, as is shown by their becoming weak and puny in confined or shaded situations. Fruit is also much injured by the trees being crowded, or having too great a quantity of wood in them. Air is therefore equally necessary to the vegetation and growth of plants, as to the life of animals.

On these accounts, therefore, all such plants as are confined under frames and glasses, or preserved in greenhouses and stoves, should be exposed as much as possible in the middle of the day, when the weather is suitable to the free influence of the air, as where this is neglected they are liable to run up too much, become feeble, lose their colour, and soon die. All the more hardy kinds, that only demand protection in severe seasons, should likewise have the full benefit of the open air every day in proper weather, by removing the glasses or other coverings. And even the tender kinds, that require the constant protection of glasses and the aid of artificial heat, as early cucumbers, melons, pines, &c. should have it cautiously admitted by propping up the glasses, &c. for a short time, in proportion to the state of the heat and the temperature of the external air, as without this they seldom succeed well, or produce fruit of a good flavour.

AITONIA, a genus comprehending a shrub of the elegant greenhouse kind.

It belongs to the class and order of *Monadelphæa Octandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved, erect, four-parted, short perianthium, divided into four ovate, sharp segments: the corolla has four erect, equal, broadly-ovate, concave, very obtuse petals: the stamina have filaments, joined as far as the middle, divided above into eight, awl-shaped, furrowed, standing out of the corolla, and having ovate, furrowed antheræ: the germ superior, ovate, smooth, and subangular: the style one, filiform, of the same

length with the stamina: the stigma obtuse, undivided: the pericarpium is an ovate, dry, membranaceous, four-cornered, one-celled, brittle berry: the corners are produced and sharp: the seeds many, fixed to a column, globular and smooth. It varies with five-cleft, ten-stamened flowers.

There is only one species at present known, which is the *A. Capensis*, or Cape Aitonia.

In this the stalk is shrubby, six feet high, the branches being alternate, roundish, wrinkled, erect, and smooth: the leaves in bunches, lanceolate, obtuse, quite entire, and smooth: the peduncles lateral, solitary, one-flowered, smooth, shorter than the leaves, and often recurved: the petals scarlet: the antheræ yellow, striped with brown: fruit resembling that of the winter cherry. But in this climate it is of slow growth, seldom exceeding three feet in height. After it is of sufficient age, it produces flowers and fruit through most of the year. The segments of the calyx, and the petals, are red at the ends; and the fruit is large, angular, and of a fine red colour. It is a native of the Cape.

Culture.—The propagation of this shrub is easily effected by means of the seed, which sometimes become sufficiently ripe in this climate.—They should be sown in pots of good mould in the early part of the spring, and then plunged in a hot-bed of moderate temperature. When the young plants are sufficiently strong, they may be removed into larger pots, and receive the same after-management as other plants of the tender greenhouse or stove kinds.

AJUGA, a genus comprehending several plants of the *Bugle* kind, which are herbaceous perennials for the purpose of ornament.

It belongs to the class and order of *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved, short perianthium, cut half way into five clefts, with the segments nearly equal: the corolla is monopetalous and ringent: the tube cylindric and bent in: the upper lip very small, erect, bifid, obtuse; middle division very large and obcordate, side ones small: the stamina have subulate, erect filaments, longer than the upper lip: antheræ twin: the pistillum has a four-parted germ: style filiform, and with respect to situation and length, as in the stamina: stigmas two, slender, the lowest shorter: no pericarpium: the calyx, which is converging, fosters the seeds, which are somewhat oblong.

The species that are deserving of notice for the purpose of cultivation are: 1. *A. reptans*, Common Bugle; 2. *A. decumbens*, Creeping Japanese Bugle; 3. *A. pyramidalis*, Pyra-

midal Blue Bugle; 4. *A. Genevensis*, Geneva Bugle; 5. *A. Orientalis*, Eastern Inverted White Bugle; 6. *A. Alpina*, Alpine Bugle.

The first species has the stalk upright, six inches high, hairy, and of a purple colour: the leaves ovate, narrowing to the base, connate, toothed, veined, in winter of a purple colour: the floral leaves smaller and shorter: the flowers are in whorls one above another, forming in the whole a spike: the calyx is hairy, nerved, and blueish: the corolla blue with white veins. It flowers from May to June, or longer.

There are two varieties of this plant—one with white flowers, and the other with pale purple flowers.

The second species sends up many stems, which are simple, or but little branched, decumbent with the ends standing up, four or five inches in length: the root-leaves many, larger than those on the stem, all petiolate, of an oval oblong form: the whole plant is villous: the flowers are in whorls, small and blue.

The third has a single stem, four or five inches in height, and very hairy, clothed with leaves pointing four ways: root-leaves oblong-wedge-shaped, sessile, entire: stem-leaves oval or oblong-obovate, slightly toothed or scalloped, not three-lobed, but diminishing upwards, so as to give the whole plant somewhat of a pyramidal form; the upper ones tinged with purple: the bractæ longer than the flowers, which are axillary, not more than three together: the calyx very hairy: the corolla narrow, twice as long as the calyx, and hairy at the tip; it has no runners. It flowers in April, or later in this climate. It is a native of most parts of Europe.

There are two varieties of it—one with red flowers, and the other with white flowers.

The fourth species approaches near to the common sort, but the leaves are downy, and the calyxes very rough. It grows wild about Geneva, as well as in many of the southern countries of Europe.

There are two varieties of this plant; one with white, the other with red flowers.

The fifth has the stem a foot and a half in height, upright, perennial, and of a brownish purple colour. The leaves are ovate, sharpish, crenate, and tomentose underneath. The flowers are of a purplish cast, terminating and axillary, in spikes. The calyx is sharp, hirsute, converging; the corolla having scarcely any upper lip, but two very small divaricating segments, adhering on each side to the lower lip, which is trifid. It was brought from the Levant.

There is a variety of this plant which has blue flowers.

The sixth species has the leaves much longer than those of the common sort: the stalks are

weaker, and decline on every side; and the whorls of flowers are much smaller, and more distant: it varies from the second, in having the leaves wrinkled, more ovate and crowded, hirsute, the petioles being shorter and broader, the spike proceeding immediately from the root.—At the top of the root are circles of leaves, whence arise leafy stems, four or six inches high. The leaves are ovate, hirsute, hispid, with three strong nerves. From each axil proceed three flowers; of which the two side ones are on shorter peduncles. The calyx is inflated, divided beyond the middle, two-lipped, the two upper segments approximating. Two obtuse toothlets form the upper lip of the corolla: the lower lip has the large middle segment rose-coloured with purple lines. The whole stem is hirsute, flower-bearing, and leafy; the flowers being concealed among the leaves, of a deep blue, not white colour; the bractæ green, not coloured. It grows naturally on the Alps.

Culture.—These are plants that require but little care in their cultivation, especially the four first species. As they all of them send off numerous side shoots, they may be readily propagated by means of them. These may be taken off, and planted out, either in the autumn or spring, in such borders or other situations as have rather a moist soil, and a slight degree of shade. The latter period is, however, in general, to be preferred.

As the plants are apt to spread out considerably, they require to be cut in occasionally; which is all the after culture that will be necessary.

The fifth and sixth species, as they send off side shoots much more sparingly, may be more easily and expeditiously raised by means of the seeds, which should be sown in pots of good loamy earth, immediately after they become ripe, and be then placed in a moist shady situation till the autumn, when they must be removed under a frame. In the early spring, as soon as the plants are in a proper state of vigorous growth, they should be transplanted into separate pots, filled with good loamy mould, and set out in some shady place during the summer season, being removed on the approach of winter, under a common frame, and exposed as much as possible to the open air when the weather is mild; but in case of frost, be protected by the glasses, or some other covering.

ALATERNUS. See RHAMNUS.

ALBUCA, *Bastard Star of Bethlehem*, a genus which furnishes different bulbous-rooted herbaceous perennial plants of the flowery ornamental kind.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that it has no calyx: the corolla has six oblong-oval permanent petals, the three outer spreading, and the three inner converging: the stamina have filaments shorter than the corolla; three opposite to the inner petals, linear-subulate, complicate a little above the base, then flat, three opposite to the outer petals, thicker; antheræ on the former oblong, fixed to the inflex tip of the filament, below the middle upright; on the latter, similar, but effete, or none: the pistillum has an oblong triangular germ: style three-sided: stigma a triangular, three-celled, three-valved capsule: the seeds numerous, flat, lying over each other, and widening outwards.

The species are numerous; but those mostly for the purposes of ornament are: 1. *A. altissima*, Tall Alba; 2. *A. major*, Great Alba; 3. *A. minor*, Small Alba; 4. *A. coarctata*, Channel-leaved Alba; 5. *A. spiralis*, Spiral-leaved Alba.

In the first species the leaves are so deeply channelled as to be almost rolled into a cylinder; two feet long, and almost three inches broad at the base. The scape a little shorter than the leaves, the thickness of a finger. The raceme two feet long or more. The peduncles bent downwards in the season of flowering, afterwards spreading and becoming finally erect; they are three inches in length. The bractæ green, except at the edge, where they are of a clear white, an inch long. The flowers are of a white colour; and the petals more than an inch in length; the outer ones sharp and thickened at the tip, but the inner blunt, bent in, and having a twin gland, composed of two globes, at the end. The fertile filaments are waved on the edge, with the antheræ curved inwards beneath the glands of the petals: the barren filaments are triangular, furrowed on the outside, a little longer than the others, and have no antheræ. The germ is subpedicelled. The style obversely pyramidal, the length of the germ, covered with glandulous scales; the angles terminate in subulate horns, covered also with scales; the centre being elongated into a pyramidal stigma. It flowers in April and May.

In the second the scape is a foot high, upright, roundish, very minutely streaked, smooth, and ash-coloured, with a glaucous bloom on it. The leaves are sharp, smooth, and streaked, a foot long. The bractæ are sheath-form, lanceolate, concave, with a long linear-subulate tip, red, nerved, smooth, straight, and solitary, at the base of the peduncles. The raceme terminating, long, of a crimson colour, and smooth: the flowers alternate, peduncled, slightly nodding; there being fewer at bottom. The peduncles round, smooth, one-flowered, longer

than the bractæ, and spreading. The petals linear, longitudinally nerved, marcescent; the three outer broader, a little concave, red, blunt at the end, bent in with a small marginal scale; the three inner narrower, upright, pale red, with a broad, thin, membranaceous, whitish rim on each side, and an ovate, membranaceous, inflex scale at the tip. The filaments erect, the length of the corolla, linear, membranaceous, whitish, joined at the base, inserted into the receptacle; they are alternately free, and fastened below by a broader base to the inner petals. Antheræ from incumbent upright; on the loose filaments barren; on the three others whitish with yellow pollen, linear, blunt at each end, emarginate, a little curved inwards, convex at the back, plano-concave in front, twin-furrowed. The germ fleshy, pyramidal-cylindric, blunt, crimson, smooth, with three calluses at the tip, on a short peduncle, ending in several small blunt teeth pressed close to it. The style very thick, somewhat flattened, with two of the angles nearer to each other, a little attenuated at the base, pubescent, red, shorter than the germ. The stigma blunt, of a yellowish red colour, pubescent at the edge. Capsule oval, smooth, transversely nerved, compressed, with two rims along the back. The seeds are orbiculate. It flowers in May.

In the third the leaves are a foot long and more, half an inch broad at the base. The scape half a foot high, scarcely a line in diameter. The raceme six inches in length, or even longer. The peduncles an inch and a half long. The bractæ are green, with clear white edges, half an inch long, quickly withering. The flowers yellow. The petals less than an inch in length; the outer ones thickened at the tip; the inner having a white, inflex, kidney-shaped gland. Barren filaments, linear, with a filiform inflex tip, and no antheræ. The style obversely pyramidal, the length of the germ, covered with glandulous scales. The stigma pyramidal, prominent between the inner converging petals. It flowers in May and June.

The fourth species has the leaves linear-subulate, deeply channelled, two feet long and upwards, scarcely half an inch wide at the base. The scape a little shorter than the leaves, and not so thick as a goose quill. The raceme close, half a foot in length. The peduncles spreading, a little more than an inch in length. The bractæ are almost the length of the peduncle. The flowers yellow. Outer petals oblong, thickened at the tip, above an inch in length; the inner ones oval, a little shorter than the outer ones. Barren filaments, somewhat shorter than the fertile ones, convex without, channelled within: the antheræ sagittate and effete. The style prism-

shaped, the length of the germ, and terminated by a stigma from the angles of the style rounded at the tip. It flowers in May.

In the fifth the root-leaves are few, linear-filiform, upright at bottom, then spiral, and when the plant is more mature, flexuose, villose-scarious, shorter than the scape, which is simple, filiform, flexuose, nodding at the top, streaked, villose-scarious, of a finger's length, seldom a span long after flowering, one-flowered, seldom two-flowered. The bractea lanceolate, acuminate, shorter than the peduncle. There are three filaments without antheræ.

They are all natives of the Cape.

Culture.—The best method of propagating these plants, is by means of offsets from the roots, which should be taken after the plants have flowered in the summer months. These are then to be planted out in pots filled with good light mould, and placed under the protection of hot-bed frames during the winter season. In this way they mostly succeed and produce flowers. But it is a better practice, where the convenience of a border can be had in the front of the greenhouse or stove, to plant them in the natural ground in these situations, as in this method they both thrive better, and flower with more vigour than when kept in pots.

The third sort is asserted by Miller to be capable of being raised from seeds, when they can be procured from abroad, as they seldom or ever ripen any in this climate.

The second species is also said to be of so hardy a nature, as sometimes to succeed when planted out on a border of light earth, in the open ground. All the species are ornamental, and afford variety in the greenhouse or stove.

ALCEA, a genus including a great variety of plants of the *Hollyhock* or *Rose Mallow* kind, which are fibrous-rooted, hardy, herbaceous flowering perennials of tall growth.

It belongs to the class and order of *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

Its characters are: that the calyx is double, each one-leaved; the outer cut half way into six parts, permanent and very spreading; the inner cut half way into five parts, larger and permanent: the corolla consists of five obovate, emarginate, spreading petals, coalescing at their bases: the stamina are filaments uniting into a sort of five-angled cylinder at bottom, loose at top, and inserted into the corolla: the antheræ almost kidney-shaped: the pistillum has a germ orbiculate, style cylindric, short, stigmas about twenty, setaceous, of the length of the style: the pericarpium is composed of many jointed arils, in a ring round a columnar flattened receptacle,

parting and opening on the inside: the seed is one, flat, kidney-shaped, in each aril.

The species which are cultivated are; 1. *Arosea*, Common Hollyhock; 2. *A. scifolia*, Fig-leaved or Palmated Hollyhock; 3. *A. Africana*, African Hollyhock.

In the first species the stem rises to a considerable height, as seven or eight feet, and has roundish leaves which are cut at their extremities into angles. It grows naturally in China, from whence the seeds are often procured. On this account it is sometimes known by the title of Chinese Hollyhock. The differences in the colours of the flowers, as well as their being single or double, are accidental, arising chiefly from cultivation.

There are many varieties of the Hollyhock: as those with white flowers,—with cream-coloured flowers,—with flesh-coloured flowers,—with pale red-coloured flowers,—with deep red-coloured flowers,—with blackish red flowers,—with purple-coloured flowers,—with pale yellow-coloured flowers,—with deep yellow-coloured flowers,—with variegated flowers.

In the second species the stem likewise rises much in height, as five or six feet or more, and the leaves are deeply cut into six or seven segments, being palmated or having the resemblance of a hand. It is also, probably, a native of the East, and has been brought from Istria.

There are several varieties with different colours, as in the former species: and a dwarf variety, with double, variegated flowers, has lately been in much esteem under the title of Chinese Hollyhock.

The third species has the stem suffruticose, four feet in height, upright, branched, and hispid. The leaves rough, alternate, petioled. The flowers of a scarlet colour, lateral, on a solitary, long, one-flowered peduncle. The pistil five-styled. The arils five, and smooth. It is a native of the eastern shore of Africa.

Culture.—The propagation of these plants is effected by seed in an easy manner. But in order to have them double, and of the best colours, as their varieties are by no means constant, the seed should always be selected from the best coloured and most double flowers, as in this mode most of the plants will produce flowers of the same kind, both in colour and fullness, if all such plants as afford only single or bad-coloured flowers have been carefully extirpated, and thus prevented from disseminating their farina, and causing them to degenerate. The seeds thus obtained should be preserved in their covers quite dry, in order to prevent their being injured by becoming mouldy, until the spring. They should then be sown upon a bed of good light earth

about the middle of April, covering them in to the depth of about half an inch. In performing this business, it is the practice with some to sow them thinly over the whole bed; while others, from the seeds being of a large size, prefer their being deposited in shallow, flat drills, made about six inches apart, and half an inch in depth. In these they should be sown in a thin and regular manner, bringing the mould back over them, and then raking the surface of the bed quite smooth. In this method the plants, from their coming up more closely together, will require to be transplanted at a more early period; but they may be covered better, and be kept clean in their early growth with more ease and facility. In either way the plants generally appear in the course of a few weeks. After the plants have put out six or eight leaves, as about the beginning of July, they should be transplanted into other beds, and set out to the distance of a foot or more each way, water being occasionally applied till they have taken fresh root. In these beds they may remain till the autumn, about the middle of October; care being taken to keep the ground clean from weeds; when they may be finally planted in the situations where they are to remain for flowering.

As the plants seldom produce any thing more than root-leaves the first year, it is the practice with some to suffer them to remain another year before the final planting out, in order that the goodness of the flowers may be ascertained. In this intention they should, however, be set out at much greater distances in the beds. The former is probably the best method, as young plants succeed with greater certainty than those of older growths; and where sufficient care has been taken in collecting the seed, there will be but few bad-flowered plants.

The Dwarf or Chinese kind, as well as the African species, may be raised from seed, either by sowing it upon a hot-bed or on a warm border, or in patches in the open ground, in the latter end of March or the beginning of April. The plants raised in the first and second method may be planted out about May or June, in places where they are to remain and flower. These mostly flower the same year, and should of course be raised annually from seed.

As most of these plants, though natives of warm countries, are hardy enough to thrive in the open air in this climate and are of tall growth, continuing to flower for a great length of time, they have long been considered as highly ornamental in the garden and pleasure ground, in the latter part of summer. Since they have become common, they have not however been regarded so much as they deserve, partly from their growing

too large for small situations, and their requiring tall stakes to secure them from being broken by winds. But in extensive grounds, where they are properly disposed, they make a fine show. As their spikes of flowers grow very long, there will be a succession of them on the same stems, often for more than two months; those on the lower part of the spike appearing first; and as the stalks advance, new flowers will be produced. When they are planted in good rich ground, their stalks often rise to a very great height, many feet of each being garnished with flowers, which when double, and of good colours, make a fine display, and produce a good effect; especially where the various colours are properly intermixed.

From the tallness of their growth in most of the sorts, they are best adapted to be placed towards the back parts of borders or clumps in shrubberies, lawns, courts, or other parts of pleasure grounds. Some of the Dwarf Chinese kind may, however, have occasionally a situation more towards the front in such places.

Though the roots of these plants are perennial, and send forth stems for many years in succession, they never flower with such vigour, or produce them of so large a size, so double, or of so good colours, as in the first two years. It is therefore necessary, in order to have good flowers of this sort, to raise some plants annually from good seed. This is the more easily effected, as all the species and varieties, both double and single, are very productive in seed for the purpose. From the plants being annual in their stem, they must be cut off and cleared away every autumn.

ALCHEMILLA, *Ladies' Mantle*, a genus comprehending several hardy herbaceous perennial plants of the ornamental kind.

It belongs to the class and order of *Tetrandria Monogynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leaved, tubulous, permanent perianthium, with edge flat, divided into eight segments: no corolla: the stamina have erect, awl-shaped, very small filaments on the edge of the calyx, the antheræ roundish: the pistillum has an ovate germ; style filiform, of the length of the stamina, inserted at the base of the germ: stigma globular: no pericarpium, the neck of the calyx closing and never opening: the seeds are solitary, elliptic, and compressed.

The species mostly cultivated are; 1. *A. vulgaris*, Common Alchemilla; 2. *A. Alpina*, Alpine Digitate Alchemilla.

In the first of these the stems are prostrate, filiform, branched, and a little hairy. The root-leaves roundish, and plaited; the stem-leaves three- or five lobed. The stipules opposite, ovate,

and toothed. The divisions of the calyx are alternately larger and smaller. The under surface of the leaves is hairy; the radical ones resting on long hairy peduncles; the stem-leaves sessile, of a roundish form, divided into seven or eight lobes scalloped round the edges. The flowers form a kind of umbel, the universal involucre being a leaf which entirely surrounds the stem, but the partial involucre goes only half way round. The mouth of the calyx is closed by a yellow fleshy ring, which perhaps answers the purpose of a nectary. The anthers and stigma turn black after flowering. The seed is generally but one; sometimes however there are two in each seed-vessel. The chief beauty of this plant consists in the leaves; and when cultivated in the garden it grows much larger than in its natural situation. It is a native of the northern parts of the island. It takes its name from the scallop in its leaves, which have some resemblance to the ladies' scalloped mantles.

In the second species the leaves are very white, and consist of from five to nine folioles, but mostly seven, shining underneath, and serrated only at the ends; the stem-leaves having only three folioles. The flower-stems seldom rise more than six inches in height. It is admitted into gardens for the sake of its elegance. It grows naturally on the mountains in the northern parts of the kingdom.

Culture.—These plants are capable of being raised either by parting the roots or by sowing the seeds. In the first method the best season for performing the business is in the autumn, in order that the plants may be well rooted before the weather becomes too dry in the spring. The soils that are most adapted to their growth, when cultivated in the more southern districts, are those that incline to moisture, and where the situations are shady. In dry exposed places they do not thrive in any perfect manner. Where the latter method is practised, the seeds should be sown in the autumn upon borders of good earth that are shady and moist. After the plants appear, the only culture they require is that of keeping them clean and free from weeds.

They are low, hardy plants, which are perennial in root, but in leaf and stem only annual. The principal merit they possess as ornamental plants, is in the singularity of their leaves, which serve to afford variety when blended with other low-growing plants in the interior parts of borders, clumps, and other compartments in pleasure-grounds.

ALDER TREE. See **BETULA**.

ALDER, Black. See **RHAMNUS**.

ALETIS, Guinea Aloe, a genus compris-

ing plants of the succulent, herbaceous, evergreen, exotic kinds, which belong to the Aloe tribe.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceæ*.

The characters of which are: that it has no calyx: the corolla is one-petalled, ovate-oblong, hexangular, funnel-shaped, semisexfid, very much wrinkled, the divisions, being lanceolate, acuminate, spreading, erect and permanent: the stamina are awl-shaped filaments, the length of the corolla, and inserted into the base of the divisions: the antheræ are oblong and erect: the pistillum is an ovate germ; the style subulate, the length of the stamina; the stigma trifid: the pericarpium is an ovate, three-cornered, acuminate, three-celled capsule: the seeds are numerous.

The species chiefly cultivated are the following:

1. *A. farinosa*, American Aletris; 2. *A. Capensis*, Waved-leaved Cape Aletris; 3. *A. Uvaria*, Great Orange-flowered Aletris; 4. *A. Hyacinthoides*, Hyacinth-flowered Guinea Aletris; 5. *A. fragrans*, Sweet-scented Aletris.

The first of these species has a tuberous root, from which arise several lanceolate leaves, and a naked stalk supporting a spike of flowers placed alternately, of a greenish white colour. The species appear in June, but are rarely succeeded by seeds in this climate. It grows naturally in North America.

In the second the bulb is tunicated, and of a violet colour. The root-leaves six, spotted with violet. The spike or raceme terminating, imbricated with great abundance of flowers, on very short peduncles; the bracte to each setaceous. The corolla subcylindrical, with flesh-coloured dots, and a very short obtuse border: the filaments adhering to it as far as the very edge. The germ is shut up in the bottom of the corolla, and the style is incurvated: the stigma being obtuse. The capsule is a little inflated, acutely keeled, compressed at the corners, and large. It is a native of the Cape of Good Hope, and flowers in this climate from November to April.

The third species, which is commonly known by the title of *Iris Uvaria*, has very long, narrow, triangular leaves, shaped like those of the bullrush; the flowers being produced in close thick spikes, upon stalks nearly three feet in height. They are of an orange colour: consequently, when the plants are strong, and produce large spikes, they make a fine appearance, and have a good effect. It flowers in August and September.

There is a variety of this with narrower leaves, and longer spikes of flowers, that has much ef-

feet as an ornamental plant. It is a native of the Cape of Good Hope.

The fourth species, or Ceylon Aletris, has the first leaves lanceolate, flat, erect, and short; the rest subulate, semicylindrical, channelled, and very long. It has fleshy, creeping roots, which multiply greatly, and seldom rises more than six inches in height.

But in the Guinea Aletris all the leaves are lanceolate, flat, and erect. They are in both of a pale green colour, with bands of a darker green; and do not appear to be specifically different. It has thick fleshy roots, like those of the flag, creeping far where they have room. The leaves come singly from the root; are near a foot and a half long, stiff, waved, proceeding immediately from the root, as also the flower-stems; which when the roots are strong are often a foot and a half in height, adorned almost the whole length with flowers of a clear white, but which seldom continue in beauty more than two or three days, and never produce seeds in this climate. It is often known by the title of Guinea Aloe.

The fifth species rises with an herbaceous stalk to the height of eight or ten feet, having many joints, and is adorned toward the top with a head of leaves, which are of a deep green colour, and reflex at their ends, embracing the stalks with their base. The flower-stems arise from the centre of the heads, and are generally two feet in height, branching out on each side, being fully garnished with white flowers, in shape somewhat like those of the second sort; but these open only in the evening, when they emit a most fragrant odour, closing again in the morning, and are not of long duration. They are however sometimes succeeded by seeds, but which are seldom capable of producing plants.

The roots in all the different species are thick, fleshy, fibrous and creeping; and from their manner of growth some of the sorts have been denominated *Aloes*.

Culture.—The propagation of these plants may be effected either by suckers and offsets from the roots, or by seeds; but as the last seldom ripen sufficiently in this climate, the former is the most general method in most of the sorts. As the first two species send off shoots very sparingly, they are raised with more difficulty than the last two, which afford heads from their creeping roots, and the sides of the stems, in a much more abundant manner. The third kind is mostly raised from seed, which it affords in great plenty.

In the propagation of these plants by the first method, the offsets, side-shoots, or heads, should

be taken off in the summer months, and be planted out in small pots of good light sandy earth, which must then be placed in a moderate bark hot-bed. In the last sort, the side heads, after being taken from the stems, should be placed in the stove for several days, that their wounds may be healed before they are planted in the pots.

In the second mode, or that of raising the plants from seed, they should be sown in pots immediately after they become perfectly ripe, and be protected during the ensuing winter by a good hot-bed frame and lights. When the plants appear in the spring they should be gradually inured to the action of the open air; and after they are become of a sufficient size, some of them may be planted out in warm borders in dry light soils: but as they are very liable to be destroyed in severe winters, a few plants should always be put in pots, in order to preserve the kind, by being protected under glasses in sharp seasons. The third sort is the best propagated in this way.

The after-management that is necessary is different in the different kinds.

The first sort, though tolerably hardy, requires the protection of a hot-bed frame during the winter, in order to preserve it. As the roots in this sort increase very slowly, and the seeds seldom become sufficiently ripened in this climate to produce plants, they are very seldom met with.

The pots in the second sort should be sheltered in a dry airy covering of glass, in winter, as the plants are too tender to thrive in the open air in this country: they should be removed into this situation in October, being sparingly watered during the winter season. About May they may be placed abroad in a sheltered situation, and in warm weather be frequently refreshed with water. In this management the plants often flower; but as they seldom perfect their seeds here, or increase much by roots, they are very scarce. As in the third sort the plants will seldom have acquired sufficient vigour or hardiness in the first season to bear the effects of cold, they should receive the protection of glasses in the second winter as well as the first.

The fourth and fifth kinds of Aletris are too tender to live through the winter in this climate, unless placed in warm stoves; and do not produce flowers if the plants be not plunged into tan-beds; for though they may be preserved in dry stoves they make but little progress. In a tan-bed they always advance faster; the leaves are much larger, and the whole plant considerably stronger. The Guinea Aletris sometimes flowers in a dry stove; but the flower-stems are

mostly weak, and do not produce half the number of flowers as when in tan; but the Fragrant Aletris has not yet flowered when kept in the dry stove in this climate. These should not be set out in the open air, even in the summer months.

The fifth sort will likewise require the same sort of management, as being constantly under the protection of the stove.

The more hardy sorts are highly ornamental in borders, clumps, and other compartments about the house; and those of the more tender kinds afford a pleasing variety in the stove and greenhouse.

ALEXANDRIAN LAUREL. See **RUSCUS**.
ALKANET. See **ANCHUSA**.

ALLEY, a narrow path, formed by treading the mould down with the feet, between beds, borders, and other parts in gardens, for the convenience of performing different operations in the cultivation of the plants that grow upon them, and in gathering the different kinds of produce. They should be made of different breadths, according to the extent of ground, and the nature of the vegetables that are to be grown upon them. Where the beds are extensive, and the plants upon them of tall growth, or where manure, water, and other materials are to be conveyed along them, they should seldom have less breadth than from two to two feet and a half. The cross alleys, that divide and separate different large compartments, should likewise have the same dimensions. Between beds of asparagus, they should never be less than two feet; but for strawberries and different sorts of plants of the herbaceous aromatic kinds, a foot and a half may be fully sufficient. In dividing the smaller sorts of beds, such as those of onions, leeks, carrots, parsnips, beet, spinach, endive, lettuce, and other similar crops, one foot will in general be fully sufficient: and for different crops of the seedling description, such as those of the cabbage, cauliflower, brocoli, celery, and other sorts of the same nature, ten inches may afford space enough for the purpose of performing the operations of pricking them out, weeding, watering, and drawing such as are in a state to be transplanted.

In flower-gardens, courts, and other places about the house, alleys are frequently designed for the purpose of producing an ornamental effect, as well as for the convenience of cultivating and managing the flowers: in these cases they should never have less breadth than two feet, and be made with the finest and best coloured gravel, sand, or other materials, and the beds be prettily edged with box, thrift, or some other

plant proper for the use. The beds of pinks, crocuses, tulips, hyacinths, ranunculuses, anemones, and other flowers of the more beautiful kinds, may be separated from each other in this way.

ALLIGATOR PEAR. See **LAURUS**.

ALLIUM, a genus comprehending Garlic, Onion, and Leek, which are mostly bulbous-rooted plants, cultivated for culinary uses.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters of which are: that the calyx is a common spatha or sheath; roundish, shrivelling, and many-flowered; the corolla consists of six oblong petals: the stamina have six filaments, subulate, generally of the length of the corolla: the anthers are oblong and upright: the pistillum has a germ superior, short, bluntly three-cornered, the corners being marked with a grooved line: style simple, stigma acute: the pericarpium is a capsule, very short, broad, three-lobed, three-celled, and three-valved; and the seeds are many and roundish.

In the Garlic kind the species are extremely numerous; but those that are chiefly cultivated for domestic uses, or the purpose of ornament, are: 1. *A. sativum*, Common Garlic; 2. *A. Scorodoprasum*, Rocambole; 3. *A. Moly*, Common Yellow Moly; 4. *A. subhirsutum*, Hairy White Moly; 5. *A. sphaerocephalon*, Spherical-headed Purple Moly; 6. *A. roseum*, Rose-coloured Montpelier Garlic; 7. *A. flavum*, Straw-coloured Pendulous Moly; 8. *A. magicum*, Great Purple Moly; 9. *A. victorialis*, Elliptical Garlic; 10. *A. descendens*, Oval Purple-headed Garlic.

The first species, or Common Garlic, has many bulbs, commonly called cloves, invested with a white skin: the leaves are linear, long, and narrow, like those of grass. It is said to be found wild in the island of Sicily.

The second sort, or Rocambole, has compound bulbs; but the cloves are smaller than those of Common Garlic. The stem rises from two to three feet high, and bears many small bulbs at top, which may be used as well as those of the root. The leaves are plane indented, every line having a two-edged vagina. It is found wild in Sweden.

The third species has the three outer petals spreading, the inner ones erect. It was formerly much preserved in gardens for the sake of its yellow flowers; but having a very strong garlic scent, it has not been lately so much cultivated. It is a native of Hungary.

The fourth has the bulb the size of a hazel nut: the stem a foot or eighteen inches high, round, smooth, and solid: the lower leaves grassy, embracing the stalk, reclining a little on

the ground; those on the stem, broad, smooth, and keeled. The flowers in an umbel, of a white colour, and rather small. It is a native of Italy, and flowers in May.

In the fifth, the stems are glaucous, not streaked, smooth, and round: the leaves flat above, convex below, becoming semicylindrical and channelled, as long or longer than the stem: the spathes not tailed, one larger than the other, and bifid: the head of a short conical form: the peduncles lengthening towards the middle, and forming a close imbricate umbel: the petals red with a darker keel, permanent, and becoming more convergent, ovate, the outer ones shorter and narrower; not awned: the filaments purple towards the top: the style is purple within, very long, and the stigma yellowish: it bears capsules, and is a native of Italy.

The sixth has the leaves linear, scarcely so long as the scape, which is cylindric. The spathe is obtuse: the flowers larger than in any of the rest, and of a dark purple colour: the stamens white and very short. It grows naturally in the fields and olive-grounds about Montpellier and in Piedmont.

In the seventh, the stalk is leafy, round, and glaucous: The leaves round, not angular, flattish above the base: the sheath twice as long as the umbel, one valve leafy: the umbel with pendulous yellow pedicels: petals of a deep yellow colour, obtuse concave, and erect: the stamens simple, twice as long as the corolla: the style short. It is a native of the South of France.

The eighth has a weak, cylindric scape a foot high, the root-leaves being broad, channelled, and obtuse. It is cultivated in the gardens for the sake of variety.

In the ninth species, the wild plant has the root-leaves half an inch broad; but when transplanted into the garden, the leaves grow to four inches in breadth, without becoming much longer. The stem is from a foot to eighteen inches in height. The petals are of a dirty white colour, with a tincture of green. It grows on the mountains of Switzerland.

The tenth has two bulbs at the origin of the stem or stalk: the leaves are fistulous and channelled above: the stalk rises to two feet in height: the sheath is quadrifid. It is a native of Italy, &c.

Except the two first, most of the sorts are of the flowering kind, having bulbous roots of different sizes; some large, others not bigger than peas. They are perennial in root, but annual in leaf and stalk, and are all hardy, prospering in almost any exposure and soil, being in general very productive. Most of the sorts have a strong scent, like that of common garlick, which

renders them much less valuable as ornamental plants.

In the Common Garlick, each of the small bulbs or cloves, on being planted, grows, and in one season attains the size and structure of the parent bulb. The leaves form a kind of stalk, which seldom spindles, except when the same roots remain in the ground two or three years; in which case they run up and bear a flower, and small bulbs at top. It is mostly cultivated in the garden for the sake of its root, which is in great estimation for culinary and other domestic uses.

In the Rocambole the bulbs are very small, compound, growing in clusters; the stalk generally spindling two or three feet in height, with many bulbs at its summit, which, as well as the root-bulbs, are useful for the same purposes as garlick, though much inferior in quality.

In the flowery kinds, the flower-stems rise immediately from the root, growing erect and attaining different heights, from twelve to thirty inches. In some the leaves are radical; in others they are elevated with the stalk; some being broad like those of the tulip, others long and narrow like the daffodil, and some taper or rush-like: but in all the sorts the stems are terminated by a sort of sheath, from which is protruded an aggregate of many small flowers, forming a kind of umbel, which, from many being collected into large heads, are very conspicuous and showy.

In the Onion kind, the species for cultivation are: 1. *A. Cepa*, Common Onion; 2. *A. fistulosum*, Ciboule or Welsh Onion; 3. *A. Schœnoprassum*, Cives or Chives; 4. *A. Ascalonicum*, Eschalot or Shallot; 5. *A. Canadense*, Canada Tree Onion.

The first species, or Common Onion, has a large bulbous root: the leaves are fistular and tapering, the flower-stem being naked, swelling out towards the bottom into a sort of belly.

It has several varieties; but those most commonly cultivated are: the Strasburgh or Common Round Onion,—the Oval Long-keeping Common Onion,—the Spanish Large Flat Onion,—the Spanish Silver-skinned Onion,—the Spanish Red-skinned Onion,—the Portugal Great Roundish Oval Onion,—and the Tripoli Onion.

The second species, or Welsh Onion, is a perennial plant, and does not form bulbs like the Common Onion. The leaves are upright, and swelling in their form.

In the third, the bulbs are long, flat, oval, very small, growing many together in small close bunches, being connected by rectilinear planes. Scapes fistulous, eight inches or a foot high: leaves fistulous, awl-shaped, rising in grea

numbers into tufts. The spathe is short, two-leaved, white, ovate, with purple lines: a few large flowers in the umbel; these are erect, cylindrical, with petals acutely lanceolate, shining, faint purple with a darker line, in two ranks, joined at the base; stamens from the origin of the petals, with broad bottoms, connected with the petals and each other. The capsule is conical and obtuse. The smell is very strong. It is a native of Italy.

The fourth species is nearly of the same size as that above. The stem is almost naked, rising about seven inches in height. The spathe is membranaceous: the bulbs are formed in a close cluster: the leaves are small, slender, and awl-shaped: the flowers less than in the above species: the petals erect, ovate, lanceolate, of a blue colour with a dark keel: the stamina of the same length as the petals; alternately broader, with trifid tops: the antheræ of a yellow colour; the style with an obtuse stigma.

In the fifth, the roots are small, bulbous, and perennial: the stem upright, nearly naked, smooth, and cylindrical, having clusters of small bulbs of the onion form at the top: the spathe ovate, pointed, and sharpish: the leaves flat, smooth, and straight, about seven inches in length. The flowers are few, pedicelled, and of a whitish colour; the petals oval with simple filaments, the length of the corolla; the antheræ being of a brownish red. It is a native of North America.

In the first of these species and varieties the roots are large and bulbous, the plants being biennial; as on being sown in the spring they arrive at perfection in the root the same year, and next year shoot up into stalk, flower, and ripen seed; when the stem quickly dies, and the individual is destroyed.

But in the second they never form any bulbs at bottom; and in the third they are very small, the plants being hardy and perennial, being capable of being continued many years by the roots.

The fourth and fifth species are bulbous-rooted perennials, which multiply greatly by offsets.

In the Leek kind there is only one species, which is the *A. Parrum*, Common Leek.

It has an oblong truncated root: the stem or scape is three feet high or more, and leafy at the bottom. The leaves are an inch wide, with the edges smooth or cauline: the spathe shortly conical, deciduous: the flowers in a close, very large ball, or head, on purple peduncles: the corolla is also purplish. It flowers in April and May.

There are several varieties in cultivation:—as the Broad-leaved or London Leek,—the Narrow-leaved Leek,—the Striped-leaved Leek.

The first of these varieties is the best for general culture, as it attains a large growth, the neck

acquiring a thick fleshy substance; in length from six to nine or ten inches, dividing upward into many large, long, thick leaves, that arrange themselves in a sort of fan-form.

The second sort runs up with a long thin neck, and narrow thin straggling leaves, which is an inferior variety that seldom deserves culture: and the Striped-leaved kind is only grown for variety. It may be continued by the suckers that rise from the old roots.

The Leek may with propriety be said to be an annual and biennial plant; for, although the roots often survive, after perfecting seed, the plants always attain perfection the same year they are sown, and the year afterwards run up to stalk, and become unfit for use. The seed-stalk in this plant does not belly, as in that of the onion.

Culture in the Garlic kind.—The propagation in all the sorts may be effected with great facility by means of offsets from the roots, and in many of them by seed, and the small bulbs contained on the stalks. Common Garlic is constantly propagated by the small bulbs that constitute the main root, which may be readily divided into a great number of separate cloves. These are to be planted in the spring, in beds four feet wide, a little raised in rows lengthways, at from six to nine inches distance from each other, six inches asunder in each row, and two or three inches in depth. The planting may be performed either by means of a blunt dibble or by drawing drills, and placing the cloves in them, afterwards covering them with the earth. When planted in this way they mostly shoot up their leaves in a month or six weeks, requiring only occasional small-hoeing afterwards, to keep the plants clean from weeds. In the beginning of June the leaves should be tied in knots, in order to prevent their spindling, and enlarge the bulbs.

About the end of July or beginning of August the bulbs are generally full grown, as is evident from the yellow appearance and the withering of the leaves: they must then be taken up, cleaned, and dried in the sun, and afterwards tied or plaited in bunches to be hung up and preserved for domestic use.

Rocambole may be propagated either by the offsets of its roots or by the cloves produced on the tops of the stalks, which may be planted in spring or autumn; but in the autumn planting, as about October or November, they generally grow considerably larger than when planted in the spring season.

The sets are to be planted in the manner directed for Garlic, and are commonly fit for use about July or August, according as they have been put in early or late. But roots of this sort never acquire any very large size.

The different flowering kinds may be propagated very readily by offsets, which may be separated any time after the decay of the flowers, taking only such as are large and fine, planting them at once in the borders or other places where they are to remain, and where they will flower in the following summer.

When the plants are propagated by seed, the best method of accomplishing it is in a shady border in the spring, the plants being ready for transplanting in such cases in the autumn following. Some of the sorts may be employed in the way of ornament, and for the purpose of variety in extensive gardens and pleasure grounds. For this use the three last species will be the most proper, though several of the others may sometimes be had recourse to.

Culture in the Onion kind.—In all these kinds the propagation is effected by seed, which should be sown annually at different times, according to the season at which the crop is wanted; but for the general crop it should always be performed from about the twentieth of January until the beginning of March, though in cold wet stiff soils it may be proper to defer sowing entirely until towards the middle of the last of these months. About the middle of February may however in general be the most proper, from the season being more favourable to the vegetation of small seeds. In case the sowing has been omitted at the times recommended above, it may often be performed with tolerable success in the beginning, or any time before the middle of April; but the crops of the February or March sowing always bulb more freely, and acquire a much larger growth than those sown at later periods.

The most suitable situation for crops of this kind is an open exposure, where the soil is of the loamy kind; moderately light, mellow, and rich, in good vegetable mould. Thus, spots of the best and most mellow ground in the garden should always be chosen; and if possible a good coat of well rotted dung or compost be dug well in, but not to too great a depth, the surface being kept level, and, while it is fresh stirred, well raked, and the seed sown upon it. This is a point which is of much importance to be attended to. The sowing should not however be performed when the surface is so wet or moist as to clog to the feet or rake in preparing it. The proper quantity of seed is in general about an ounce to every rod or pole of ground; but where it is not required to have them thick for cullings, two ounces for three rods may be fully sufficient, as the plants are much weakened and drawn up by standing too thick. Great care should constantly be taken to procure fresh seed, as but very little of that which is kept more

than one year will vegetate. It is always the best method for the cultivator to save it himself. The seed may either be sown over the whole of the piece or plat of ground, or it may first be divided into beds of four, five, or six feet in width, allowing foot-wide alleys between them. In sowing in the broad-cast method, the seed should be dispersed over the ground with a regular spreading cast, it being a practice with some to tread the surface over immediately afterwards evenly upon the seed. This however is improper, except where the soil is very light. Where sown in beds, the alleys may be afterwards pared an inch or two deep, and the earth cast over them, directly raking them regularly with an even hand, trimming off all the stones, roots, &c. They may also be sown with success in drills, at the distance of eight or twelve inches. See SOWING SEEDS.

But the method of sowing them in beds is the most eligible, where it is designed to draw young onions from time to time for market or family use; as in such cases a person can stand in the alleys without treading upon the beds; which not only renders the surface hard, so as to injure the crop, but is highly detrimental, by trampling upon the plants themselves. They likewise afford much convenience for standing in the alleys, in order to weed, thin, and hoe the crops.

Although it is a common practice in the general culture of onions to sow them thick, in order to allow for drawing out the superabundant plants by degrees as they are wanted, it would certainly be a better mode to sow a piece particularly for general culling, exclusive of the main crop, as by daily thinning out the superfluous plants there is no avoiding treading upon, bruising, disturbing, and loosening the remaining ones, by which they become stunted in their growth, and by no means so fine.

There is also another very common but injudicious practice, which is that of mixing other crops, such as those of the leek, lettuce, radish, and carrot kind, with these crops. This is productive of much inconvenience and obstruction to the chief crop, without producing any great advantage: nothing should therefore be admitted except a very thin sprinkling of coss-lettuce in some cases.

In about a fortnight or three weeks after the seed is sown, the plants generally appear, and in a month after that, as in May and the beginning of June, they will be three or four inches high; when they should be well cleaned from weeds, and the main crop thinned to three or four inches distance. The weeding and thinning should be begun in due time, when the weather is dry, before the weeds branch out and spread much; which may either be performed by the hand or a small hoe: the latter is the more expeditious

method, as by it one man may do as much as three: and it is also the most beneficial to the plants, as, by stirring the ground about them with the hoe, it greatly forwards their growth, as is mostly seen in a few days after the operation has been executed. This mode is more particularly eligible for the larger principal crops, for which a good sharp one-hand hoe, about two inches or not more than two and a half broad, is the best, carefully cutting up all sorts of weeds. Where the onions stand too close they should be cut out in a regular thinning order to about three inches distance in the first hoeing; and in the second, which should be done a month or five weeks after the first, in such crops as are not wanted for occasional drawing, they may be hoed out to four or five inches, or more, leaving the strongest plants as much as possible for the continuing crop. Where the beds are very clean, the plants may be set out at the first hoeing to these distances. It is of much consequence to the crops that the plants have plenty of room. It will generally be proper to run over them again in the same manner a few weeks afterwards, in order to cut up all advancing weeds, and any superabundant plants that may have escaped in the former operations; after which they seldom require any further culture than that of pulling out such casual straggling weeds as may present themselves.

Where the crops are small, or where they are required for thinning or drawing by degrees, for use in their young green state and in small bulbs, the weeding and thinning, where in clusters, may generally be best performed by the hand.

In the more advanced growth of the crop, where the superabundant plants are occasionally thinned out for use as wanted, they should be drawn in a regular manner, so as to leave a sufficiency of the strongest plants remaining at moderate distances for a crop to attain their full growth.

It is highly necessary to continue to keep the crops very clean from weeds in their advancing growth during the months of May, June, and July; which begin their principal growing season, if they are not kept quite free from weeds, and sufficiently thinned, they draw up weak and slender, by which their bulbing is much retarded. About the middle or latter end of June the crops begin swelling a little at bottom, but more fully in July; and in August the bulbs arrive to full growth, and are proper for taking wholly up. But about a fortnight, three weeks, or more, before this time, when they begin to bulb, the stems should all be broken down or *laid*, which is most readily performed by two persons passing a small pole or rod along the beds, so as to strike

the necks of the onions about four inches from the bulbs. Some, however, twist the necks by the hand; which effects the business more effectually. The nourishment of the plants being in this way diverted from the stem, tends to promote the swelling of the bulbs.

Towards the middle of August the crops must be examined; and when the necks shrink and fall, and the leaves wither, it may be concluded that the bulbs are arrived at maturity and have done growing. They should then be pulled up, cleaned, and dried; which is best done in dry weather, on a piece of ground raked and cleaned, in order to spread them upon, to dry and harden as they are pulled up. They should lie in this way a week or more, being turned every day or two; after which the first opportunity should be taken to house them. The bulbs must be first divested of all adhering earth, loose skins, and the grossest part of the leaves and neck, rejecting all the bad and bruised ones; and then they may be deposited in any dry upper room, out of the damp, spreading them thinly on the floor. The closer the room in which they are kept, the better; but care must be taken to turn them over occasionally, and to clear out such as have any tendency to become putrid.

As in the culture of onions it frequently happens, that through badness of seed, or other causes, persons are disappointed of a crop, by waiting, in expectation of the plants coming up, till it becomes too late to sow again; in such cases, recourse may be had to the practice of transplanting from other beds or gardens where there are superfluous crops. This business is best done in May, or early in June, and, if possible, in moist weather: having a spot of well dunged ground prepared, the plants should be taken up with good roots, and immediately planted in rows six inches distant, and four inches apart in each row, inserting the roots but a little way into the ground; for, if planted deep, they do not bulb well. A good watering should be given as soon as the plants are put in. By repeating the waterings occasionally for a week or fortnight afterwards, the plants will generally grow freely, and form tolerably handsome bulbs. It is probable that this method might sometimes be adopted in the more early crops with advantage in respect to the size of the bulbs, as it is generally employed in Portugal where the culture of these crops is carried to much perfection.

Onions for pickling are in great request in many places: those proper for this purpose should not be bigger than common round bottons. In order to procure them of this size in due quantity, some seed should be sown late, in a spot of light poor land: about the middle of

It is propagated by planting the bulbs either in spring or the autumn, the root-bulbs, or those produced on the top of the stalk, being proper for the purpose. They should be set in a bed of good earth, in rows a foot asunder, six inches distant in each row, and two or three inches in depth; in which case they will shoot up leaves and stalks in the spring and summer, and produce the bulbs for use in July or August; and the root-bulb remaining afford a production of top-bulbs annually in that season. The root-bulb increasing by offsets may be taken up occasionally at the time the stem decays in autumn, or once in two or three years, in order to separate the offsets, and replant them when necessary.

Culture in the Leek kind.—The Common Leek is raised annually from seed sown in the spring; the proper time for the general crop, for autumn and winter use, is the same as that recommended for the onion, as from the middle of February to the end of March; but for later crops to stand for spring use, any time in April may answer; or for a small crop to stand as late in the following spring as possible, without running to seed, the beginning of May may be the most proper.

It is a common practice, from the notion of making the most of the ground, to sow leeks along with crops of onions; but which should not by any means be recommended, as experience has shown it to be considerably the best culture to keep them separate. It is mostly done by the market gardeners, when intending to draw out the onions from time to time for market; so that, by a daily thinning, they are commonly all cleared off by the end of July, when the ground remains occupied by a crop of leeks.

The best culture for the general crops of leeks is to sow them pretty thick in a spot by themselves, to be afterwards transplanted, either wholly, or the greater part thinned out regularly and replanted, the others being left at good distances for full growth. For this purpose the same situation, soil, and method of sowing, is to be made use of as for the onion. In June, July, and August, the plants will be of a proper size for transplanting; in doing which an open spot of the best ground should be chosen, and dunged well by digging it in one spade deep, afterwards drawing a parcel of the largest plants, and trimming their tops and the extreme parts of their root-fibres, planting them by the line and dibble in rows, which for the early crops should be twelve inches distant, and eight or nine inches apart in each row; and for later crops nine inches between the rows and six the other way, putting them three or four inches in the ground, or nearly to the length of their necks, watering them immediately after the work has been performed.

The only culture they require afterwards is to

be kept clean from weeds, which may be done either by hand-weeding, or more expeditiously by applying a sharp hoe in a dry season. Leeks thus cultivated are generally finer than those that remain where sown; their necks, which are the principal esculent parts, being much longer, and all the parts within the earth finely whitened, and rendered mild and tender; which are desirable properties in this plant. However, when it is intended to raise a crop of leeks in good perfection, to remain where sown till their full growth, the seed should be sown much thinner; and when the plants are somewhat advanced, as in June or July, they should be regularly thinned to about ten or twelve inches distance. Those thinned out being planted out separately, the remaining plants will by this means attain a larger and thicker growth below, with large spreading tops of thick fleshy leaves. This is a valuable family plant from autumn till spring, for soups, broth, &c. and for boiling the neck part and top leaves together, to use as greens, in the manner of coleworts, &c. It is in perfection from September till May, when it shoots up to stalk for seeding.

In order to save the seed of this plant, a quantity of the finest plants should be transplanted in February, into a sheltered sunny bed, or under a south wall, paleing, hedge, or other fence. This is necessary, as the seeds ripen late in the autumn, and, unless assisted by such situation and shelter, seldom become fully ripened in this climate. In June, when they have shot up and formed their stems, they should be supported and continued in an upright growth. And in July the flowers protrude from their sheath at the summit of each stalk, and form large globular heads, the seeds beginning to ripen in September, which, after they have come to perfect maturity, should be cut off, tied up in bunches, and hung up till perfectly dry; when the seed should be rubbed out, and put by in a dry situation till it is wanted for use.

ALLSPICE. See MYRTUS.

ALMOND, *African*. See BRABEUM.

ALMOND, *Dwarf*. See AMYGDALUS.

ALMOND-TREE. See AMYGDALUS.

ALNIFOLIA. See CLETHRA.

ALNUS. See BETULA.

ALOE, a genus comprehending several perennial, evergreen, succulent, highly ornamental plants of the African Aloe kind, and mostly of the tender exotic sort.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceae*.

The characters of which are: that it has no calyx: the corolla is one-petalled, erect, sexfid, and oblong; the tube gibbous; the border spreading and small; nectareous at the bottom; the

stamina have awl-shaped filaments, as long as the corolla, or longer; inserted into the receptacle; the antheræ oblong and incumbent: the pistillum is an ovate germ; the style simple, of the length of the stamina; the stigma obtuse and trifid: the pericarpium is an oblong capsule, three-furrowed, three-celled, and three-valved; the seeds are several, and angular.

The species are very numerous, but those of the most curiosity and beauty are: 1. *A. dichotoma*, Smooth-stemmed Tree Aloe; 2. *A. perfoliata*, Perfoliate Aloe; 3. *A. arachnoides*, Cobweb Aloe; 4. *A. margaritifera*, Pearl Aloe; 5. *A. verrucosa*, Warted or Pearl-tongue Aloe; 6. *A. carinata*, Keel-leaved Aloe; 7. *A. maculata*, Spotted Aloe; 8. *A. Lingua*, Tongue Aloe; 9. *A. plicatilis*, Fan Aloe; 10. *A. variegata*, Partridge-breast Aloe; 11. *A. viscosa*, Upright Triangular Aloe; 12. *A. spiralis*, Spiral Aloe; 13. *A. retusa*, Cushion Aloe; 14. *A. spicata*, Spiked Aloe.

The first has the trunk round, upright, very stiff, ash-coloured, smooth, and of an extremely even surface, dichotomously branched at top, two fathoms in height, the thickness of a man's thigh. The branches are dichotomous, upright; a foot and more in length, leafy at top. The leaves are perfoliate, sword-shaped, and toothleted, convex beneath, flat above, from spreading becoming upright, smooth, fleshy, a foot long, the upper ones gradually smaller. It is a native of the Cape of Good Hope.

The second species grows to the height of ten or twelve feet, with a strong naked stem, the leaves growing at the top, and closely embracing the stem; they are about two inches broad at the base, growing narrower to a point, and are reflex, and indented on their edges, each being armed with a strong crooked spine. The leaves are of a sea-green colour, and very succulent. The flowers grow in pyramidal spikes, and are of a bright red colour. They are in beauty in November and December.

In the new edition of Miller's Dictionary, by professor Martyn, the Narrow-leaved Sword Aloe, or *Aloe arborescens*; the Broad-leaved Sword Aloe, or *Aloe Africana*; the Barbadoes Aloe, or *Aloe Barbadensis*; the Succotrine Aloe, or *Aloe Succotrina*; the White-spined Glaucous Aloe, or *Aloe purpurascens*; the Red-spined Glaucous Aloe, or *Aloe glauca*; the Red-spined Striped Aloe, or *Aloe lineata*; the Great Hedgehog Aloe, or *Aloe ferox*; the Great Soap Aloe, or *Aloe saponaria*; the Common Soap Aloe, or *Aloe obscura*; the Hollow-leaved Perfoliate Aloe, or *Aloe serrulata*; the Upright Perfoliate Aloe, or *Aloe suberecta*; the Short-leaved Perfoliate Aloe, or *Aloe depressa*; the Dwarf Hedgehog Aloe, or

Aloe humilis; the Great Mitre Aloe, or *Aloe mitraciformis*; and the Small Mitre Aloe, or *Aloe brevifolia*, are considered as varieties of the above species.

The Narrow-leaved Tree or Sword Aloe rises with an erect, shrubby stem to some height, sending forth long, narrow, reflex, indented, spinous leaves, that embrace the stem at their base, and a pyramidal spike of red-coloured flowers.

The Broad-leaved Sword Aloe resembles it much; but the leaves are broader, and have several spines on their backs towards their extremities: the flowers also grow in a looser spike.

The Barbadoes Aloe has the leaves about four inches broad at their base, where they are near two inches thick: they have a few indentures on their edges; are of a sea-green colour, and when young are spotted with white. The flower-stem rises near three feet high, and the flowers stand in a slender loose spike, with very short peduncles, and hang downwards: they are of a bright yellow colour, and the stamens stand out beyond the tube. But the form of the flowers, and the manner of flowering, show it to be a variety of the second species. Though generally known by the name of Barbadoes Aloe, it is common in the other islands of America, where the plants are propagated on the poorest land, in order to obtain the Hepatic Aloes.

The Succotrine Aloe has long, narrow, succulent leaves, which come out without any order, and form large heads. The stalks grow three or four feet high, and have two, three, and sometimes four of these heads branching out from it: the lower leaves spread out on every side, but the upper leaves turn inward towards the centre: the flowers grow in long spikes, upon stalks about two feet high, each standing on a pretty long footstalk; they are of a bright red colour tipped with green; and they generally appear in the winter season.

The Great Hedgehog Aloe rises to the height of eight or ten feet, with a strong stem: the leaves grow on the top, which closely embrace the stalk; they come out irregularly, and spread every way; and are near four inches broad at their base, diminishing gradually to the top, where they end in a spine. They are of a dark green colour, and closely beset with short thick spines on every side. This sort has not yet flowered in this country; nor does it put out suckers: so that it is difficult of propagation.

The Great Soap Aloe seldom rises much above two feet in height. The leaves are very broad at their base, where they closely embrace the stalk, and gradually decrease to a point: the edges are set with sharp spines, and the under leaves spread

open horizontally every way; these are of a dark green colour spotted with white, somewhat resembling the colour of soft soap. The flowers grow in umbels on the tops of the stalks, and are of a beautiful red colour, appearing in August and September.

The Common Soap Aloe has broader leaves, of a lighter green; the edges and spines are copper-coloured, and the flowers grow in loose spikes.

The Short-leaved Perfoliate Aloe is a humble plant, seldom rising more than a foot high: the leaves grow near the ground; they are broad at the base, where they embrace the stalk, and gradually diminish to a point; they are of a sea-green colour, with some white spots; their edges, and also their upper parts both below and above, are beset with pretty sharp spines: the flowers grow in loose spikes, the tubulous part being red, and the brim of a light green colour.

The Dwarf Hedgehog Aloe is a very low plant, never rising into stem: the leaves are broad at their base, but taper to a point, where they are triangular; they are beset on their edges and both surfaces with soft spines very closely, from whence this plant has its name. The flowers grow in a loose head on the top of the stalk, which is very thick, but seldom a foot high: they are of a fine red colour below, but of a pale green above. The flowers show that it belongs to the above species, though it may appear different by its habit.

The Great Mitre Aloe grows, with an upright stalk, to the height of five or six feet: the leaves closely embrace the stalks; they are thick, succulent, of a dark green colour, and have spines on their edges, as also a few on their upper surface; they stand erect, and converging towards the top, forming the resemblance of a mitre. The flower-stem rises about three feet in height: the flowers come out at the top of it in a sort of globular spike, which afterwards becomes cylindrical; these have long peduncles, which stand horizontally, and the flowers hang downwards; they are cut to the bottom into six unequal segments, three being alternately broader than the others. Three of the stamens are as long as the tube of the corolla, the other three are shorter; the tube being of a fine red colour, but the brim of a pale green.

The third species, or Common Cobweb Aloe, never rises from the ground, but the leaves spread flat on the surface; they are plain, succulent, and triangular towards the end: the borders and keel are closely set with soft white spines. The flower-stem rises about a foot in height, is very slender, and has three or four small distant herbaceous flowers.

The Small Cobweb Aloe, which is a variety of the above, grows near the ground: the leaves are almost cylindrical towards their base, but angular near their ends, and are set with short soft spines at the angles. The leaves of this variety are shorter and of a darker green colour than those of the former, and the plants produce many suckers on every side.

The fourth, or Pearl Aloe, is of humble growth: the leaves come out on every side, without order, near the ground; they are thick, triangular at their ends, and closely studded with white protuberances; whence its name.

There is a smaller sort which has been long preserved in gardens in this country. The plants flower in several seasons of the year.

The fifth species has long, narrow, tongue-shaped leaves, which are hollowed on their upper side, but keel-shaped below: these are closely studded on every side with small white protuberances, from whence the plant has the title of Pearl-tongue Aloe. The flowers grow on pretty tall stalks, and form loose spikes, each hanging downwards: they are of a beautiful red colour, tipped with green. It produces offsets in plenty, and flowers at different seasons of the year.

The sixth has broader and thicker leaves, spreading out every way, not so concave on their upper surface, nor are the protuberances so large as those of the above sort: the flowers are of a paler colour, and the spikes are shorter.

In the seventh species the leaves are tongue-shaped; three-cornered, gradually drawing to a point, smooth, upright, a span in length. The corolla is sub-cylindrical, thicker at the base, curved back in the middle, angular at the tip; the angles green, somewhat flesh-coloured; the three outer segments divided to the curvature, thicker; the inner ones distinct from each other, but longitudinally connected with the outer ones on the inside. It begins to flower about August, and is a native of the Cape of Good Hope.

There are varieties with large, oblong, white, confluent spots; and with small ones.

The eighth species, or Tongue Aloe, grows with its leaves near the ground; they are about six inches in length. The flowers are in slender loose spikes, each hanging downwards, of a red colour at bottom and green at the top.

There is a variety of this which has the leaves much more spotted.

The ninth species, or Fan Aloe, grows to the height of six or seven feet, with a strong stem, toward the upper part of which are produced two, three, or four heads, composed of long, compressed, pliable leaves, of a sea-green colour, entire, and ending obtusely; these are placed in a double row, lying over each other

with their edges the same way. The flowers are produced in short loose spikes, are of a red colour, and appear at different times of the year.

The tenth species, or Partridge-breast Aloe, is a low plant, seldom rising above eight inches in height. The leaves are triangular, and turn back at their extremities; they are fleshy and entire, their edges being very slightly serrated, being curiously veined and spotted, somewhat like the feathers on a partridge's breast. The flowers grow in very loose spikes, upon stalks about one foot high; they are of a fine red colour, tipped with green. The corolla is flesh-coloured, with a sexfid mouth, the three inner divisions alternate, spreading; the stamens bending down, and the stigma simple.

A variety of this has been raised, from seeds received from the Cape of Good Hope, by professor Martyn, in which the leaves were broader, and spreading much more than those of the former; but which were not so beautifully spotted, the flower-stalks growing much taller.

The eleventh species grows near a foot high, and is furnished with triangular leaves from the ground upwards; which are of a dark green colour, and placed in form of a triangle: the flowers grow thinly on very slender peduncles, they are of a herbaceous colour, and their upper part turns backward.

The twelfth grows somewhat like the last, being beset with leaves from the bottom; but which are rounder, and end in sharp points: the flowers grow upon taller stems, which branch out and produce long close spikes.

A variety of this has been raised from seeds, which is much larger, the leaves thicker, and the stem taller.

The thirteenth species, or Cushion Aloe, has very short, thick, succulent leaves, which are compressed on their upper side like a cushion; hence its name. It grows very close to the ground, and puts out suckers on every side: the flowers come out on slender stalks, and are of a herbaceous colour. It much resembles the second species, but is very different in the spike, and figure of the flowers.

In the fourteenth species the stem is round, leafy at the top, three or four feet high, the thickness of the arm. The leaves subverticillate, broad at the base, gradually drawn to a point, channelled, acute, with remote teeth, spreading, two feet long. The flowers are in very close spikes, spreading horizontally, a foot in breadth. It has a single bracte under each flower, ovate, acute, broad, membranaceous, white with three green streaks, a little shorter

than the corolla, which is bell-shaped, almost six-petalled; the three inner segments not connected, broader, ovate, blunt, white with three green lines; the three outer connected with the others at the base, narrower and less concave, but like them. The flower is full of a purple honey juice.

Culture.—The propagation of these plants is effected in different methods according to their nature. As many of the roots afford plentiful supplies of suckers or offsets from their roots, they may be easily raised in that way. And in those which do not possess this property, it may be often accomplished by taking off some of the under leaves. Where ripe seeds can be procured they may also be raised in that method.

But in order to the successful cultivation of the aloe in this climate, it is necessary that it have a proper soil prepared for it. This should be constituted of about one-half of fresh, good, light mould, which has a considerable proportion of decayed vegetable matter in it, and one-fourth part of sea sand, or the scrapings of turnpike roads after they are become dry and of a sandy nature, with an equal quantity of effete lime, such as the siftings of lime rubbish. These substances should be intimately incorporated and blended together by frequent turning over with the spade: and to render them perfectly mellow, and suitable for the purpose, they should be suffered to remain in this state of mixture for eight or twelve months before they are made use of.

With this earthy compost some very small pots are to be filled in a pretty close manner. The suckers, offsets, or root-leaves, are then to be planted out separately in these pots of earth, which should be lightly pressed round them. The most proper season for performing the work is about the middle of July, when the old plants are shifted. The suckers or other parts, which are to be made use of as sets, should be taken off from the old plants with great care; and when they appear in any degree moist on the part where they were separated, it will be necessary to put them by in some dry place out of the ground for a few days before they are planted out, in order that they may be rendered so dry as to prevent their rotting; and in cases where leaves are employed, till the succulent parts that are wounded in their removal be healed over. After being planted out in the pots, they should be slightly watered, and then set in some shady situation for about a fortnight; after which the more tender sorts may be removed into a very moderate hot-bed, being plunged up to the rims. By this means they strike new root more readily. But here it will likewise be necessary to shade

the plants in the heat of the day, and to let them have as much air as possible.

Where leaf-sets are made use of, they should be planted in June, setting the part that was separated from the old plant an inch or an inch and a half into the earth. Some prefer plunging the pots immediately into the hot-bed, as in this way they push forth heads before the winter sets in.

About the middle of August it will be necessary to begin to harden these young plants. This is to be performed by removing the glasses occasionally when the weather is fine, and in other circumstances raising them by props in such a manner as to admit the air freely, and thereby promote their vigour and growth. In this way they will become fit to be removed into the house, which must be performed about the latter end of September. After this the plants are to be treated in the same manner as old plants, as below.

The shifting of the old plants is to be performed at the same period as directed for the planting of the sets. In managing this business the plants are to be removed from the pots, and the earth carefully separated from between the roots. All the decayed and mouldy roots must then be taken off, without breaking or in any way injuring the young ones. When the roots have been thus cleaned, the pots are to be filled about three parts full with the above earthy material, a few pebbles being placed in their bottoms in order to prevent the moisture from stagnating too much about the roots of the plants. The roots are then to be placed out in such a way as not to interfere with each other, more of the compost being afterwards applied so as to fill up the pots to the rims, shaking the plants a little in order to let the mould in between the roots, and settling it with the hand close to them to keep them steady. Water must be immediately applied in a sparing manner, and the plants be set out abroad in some shady situation, where they may remain about three weeks, water being then sparingly administered occasionally when the season is dry and hot.

In a dry time, about the latter end of September, they should be again removed into the house, as much free air as possible being admitted to them while the weather continues warm; but as the nights begin to be cool the glasses should be shut up, air being only admitted in the day-time; and in proportion as the cold increases they should not be opened at all, though water should be frequently given in small proportions till towards the middle of October, after which it should be decreased according to the temperature of the

house in which they are kept. Those plants which are preserved in stoves generally require to be watered at least once a week the greatest part of the winter; while those which are kept in greenhouses, without artificial heat, do not stand in need of being watered oftener than once a month in that season.

While the hardier sorts of Aloes are set out abroad in the summer, they should have but little water given them; and when much rain falls during the time, they should be screened from it in some way or other; as, when they imbibe much wet in that season, they frequently rot the following winter, especially if they are kept in a moderate warm air: consequently, those who choose to treat the plants in a hardy manner should be cautious of their receiving too much moisture during the summer season.

These sorts thrive much better when they are thus exposed in summer, and secured from the cold and rain in winter, than if they were treated more tenderly: as, when they are placed in stoves, from their being kept growing all the winter, they are drawn up weak; and though they may flower oftener when they have a moderate share of heat, in two or three years the plants do not appear so handsome as those which are treated more hardily.

All the tender sorts, as the Cobweb, the Upright Triangular, and the Great Hedgehog Aloes, should either constantly remain in the stoves, or be removed in summer to glass cases, where they may have a free admission of air in warm weather, and at the same time be protected from rain and cold. In this management the plants mostly thrive and increase perfectly, and such of them as usually flower produce them in beauty at their proper seasons.

In respect to the culture of the Aloe plant in the island of Barbadoes, it is remarked by Mr. Millington, in a paper in the Medical Journal, that the grounds to the distance of two or three miles from the sea, which are subject to be injured by drought, and which are so shallow and stony as not to admit of the successful planting of the sugar-cane, are found the most adapted to the raising of the Aloe plants. In preparing the land, the stones, at least the larger ones, are first picked up, and either packed in heaps upon the most shallow, barren spots, or laid round the field as a dry fence. It is then lightly ploughed, and very carefully cleared of all noxious weeds, marked with lines at one foot distance from row to row, and the young plants set, like those of the cabbage, at about five or six inches from each other. This regular mode is, however, only practised by the more exact planters, to facilitate the

weeding of them by hand; as, if the plants are not kept perfectly clean, and free from weeds, the produce is very small. They bear being planted in any season of the year, even the driest, as they will live on the surface of the ground, without any rain, for many weeks.

The method of collecting the juice of the plants, and preparing the resinous extract, is described in the following manner in the new edition of Miller's Dictionary:

In the month of March, when the plants are a year old, the labourers carry a parcel of tubs and jars into the field, and each takes a slip, or breadth of it, and begins by laying hold of a bunch of the blades, as much as he can conveniently grasp with one hand, while with the other he cuts it just above the surface of the earth, as quickly as possible (that the juice may not be wasted,) and then places the blades in the tub, bunch by bunch or handful by handful. When the first tub is thus packed quite full, a second is begun, (each labourer having two,) and by the time the second is filled all the juice is generally drained out of the blades in the first tub. The whole of the blades are then lightly taken out, and thrown over the land by way of manure, and the juice is poured out into a jar. The tub is then filled again with more blades, and so alternately, till the labourer has produced his jar full, or about four gallons and a half of juice, which is often done in six or seven hours: and he has then the remainder of the day to himself, it being his employer's interest to get each day's operation as quickly done as possible. Though the Aloe plants are often cut in nine, ten, or twelve months after being planted, they are not in perfection till the second or third year: but they are productive for a length of time, as ten or twelve years, or even for a considerably longer time, if good dung or manure of any kind be strewed over the field once in three or four years, or oftener. As the aloe-juice will keep for several weeks without injury, it is not boiled till a sufficient quantity is collected to make it an object for the boiling-house. In the large way, three boilers, either of iron or copper, are set up for one fire, though some have but two, and the small planters only one. The boilers are filled with the juice; and as it ripens, or becomes more inspissated, by a constant regular fire, it is ladled forward from boiler to boiler, and fresh juice added to that furthest from the fire, till that which is in that nearest the fire, which is much the smallest, and commonly named *tatch*, as in the manufacture of sugar, becomes of a proper consistency to be skipped, or ladled out into gourds, or other small vessels destined for its final reception. The proper time to skip or ladle it out of the *tatch* is when it is arrived at what

is termed a resin height, or when it drops freely, or in thin flakes, from the edges of a small wooden slice, that is dipped from time to time into the *tatch*, for that purpose. Some aloe-boilers make use of a little lime water during the process, when the ebullition is too great.

The process of sun-drying is very simple, though extremely tedious. The raw juice is either put into bladders, left quite open at top, and suspended in the sun, or into broad shallow trays of wood, pewter or tin, and exposed in the same manner every dry day, until all the fluid parts are exhaled, and a perfect resin formed, which is then packed up for use, or exportation.

The extract prepared from the Barbadoes Aloe is generally of a coarse appearance.

That of the best quality has the name of Succotrine Aloes, from the circumstance of the island of Zocotra or Socotora, in the straits of Babel-mandel, having formerly been famous for the preparation of the extract. It is of a yellowish brown colour, approaching to purple, and when reduced to powder has a sort of gold colour.

The Aloe plants, from the great differences in their heights, modes of growth, and the shapes of their leaves, as well as the beauty of their flowers, are well adapted for the purpose of affording variety, and producing a singularity of effect in the greenhouse, or in courts or other places about the house during the summer season.

ALOE *Africana*. See CRASSULA.

ALOE *Americana*. See AGAVE.

ALOE *Uvaria*. See ALETRIS.

ALSTROEMERIA, a genus comprising different herbaceous perennial plants of the exotic kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceae*.

The characters of which are: that it has no calyx: the corolla is six-petalled and sub-bilabiate, the three outer petals being wedge-shaped, retuse, mucronate; the inner, which are alternate with the others, lanceolate, the two lower ones tubulous at the base: the stamina have awl-shaped filaments, bending down and unequal: the antheræ oblong: the pistillum has a germ inferior, hexangular, truncate, the style bending down, filiform, of the length of the stamen: the stigmas three, oblong and bifid: the pericarpium is a roundish, six-ribbed, mucronate capsule, three-celled and three-valved: the valves concave, and contrary to the dissepiment: the seeds very many, globose, covered with raised points, sub-umbilicate at the tip.

The species more generally cultivated are:

1. *A. pelegriana*, Spotted-flowered Alstroemeria;
2. *A. Ligtu*, Striped-flowered Alstroemeria;
3. *A. Salsilla*, Climbing Alstroemeria; 4. *A. multiflora*, Many-flowered Alstroemeria.

The first species rises with several erect herbaceous stems, to the height of three feet, having linear spear-shaped leaves, the branches being terminated by flowers on long foot-stalks, two or three together, mostly of a whitish colour, but very beautifully stained and varied with purple and red. It flowers from the latter end of May or beginning of June till October.

The second has erect herbaceous barren stems clothed with awl-shaped leaves pressed to them; terminated with spatulate-oblong leaves, placed in a kind of rose. The floriferous stem also is clothed with awl-shaped leaves, clasping close to it, and terminated with a shorter involucre. The peduncles are few, very simple, naked, longer than the involucre. The three upper petals of the corolla are larger, white, dotted at the base, spotted at the tip with red; the three lower ones shorter, especially the lowest, almost awl-shaped, and red. The filaments are longer than the lower petals, and rugged; the antheræ twin, yellow; the pistil red. It is remarkable for the largeness of the flowers, and for their fragrantcy. It flowers in the spring, the greater part of the summer, and autumn.

The third species rises with twining climbing stems, with spear-shaped, acuminate, nervose leaves; the petioles naked. Involucre many-leaved, awl-shaped, reflex. The peduncles few, elongated, sustaining one or two flowers; a bracte at the branching of the peduncles: petals from erect spreading, rather blunt; the outer ones red, the inner of a greenish colour.

The fourth species has the habit and structure of the above; but the petioles are wrinkled at the edge, and the umbel is not peduncled: the many-flowered involucre consists of broader leaflets; the peduncles are quite simple and naked; the flowers are of the size of the Salsilla: the three outer petals shorter, narrower, entire; the inner truncate, or emarginate with a point.

These are all natives of South America.

Culture.—These plants are capable of being propagated in different ways, as by seeds, cuttings of the stalks, and parting the roots. In the first method, which is mostly practised in raising the Spotted-flowered kind, the seed should be sown in the spring in a pot of light earth, and immediately plunged into a very moderate hot-bed of either bark or dung. In the other two methods the spring is also the best season for raising the plants, the cuttings or parted roots being placed in pots filled with light mould, and directly set in hot-beds which possess only very gentle heats. They should remain in these till the plants have fully stricken root; when during the summer months they may be placed under the protection of the greenhouse, being occasionally

very slightly watered, and having a pretty free admission of air.

The first species is much more hardy than the second, so much so as to be capable of being treated as a greenhouse plant. But though this may be the case, it, as well as the other sorts, not only flowers, but ripens seeds better when kept under the glass of a hot-bed frame, where there is a full admission of air.

These are plants, that, from the beauty of their flowers, which continue in blossom in succession the greatest part of the summer, deserve to occupy the more conspicuous situations in greenhouse and stove collections.

ALTHÆA, a genus comprehending different herbaceous perennials of the *Marsh Mallow* kind, which are mostly plants of hardy growth.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferæ*.

Its characters are: that the calyx is a double perianthium, outer smaller, one-leaved, unequally novem-fid or nine-cleft, (6—12,) divisions very narrow, inner semiquinquefid, divisions broader and sharper: the corolla is five-petalled, united at the base, obcordate, præmorse and flat: the stamina have many filaments inserted into the corolla; antheræ subreniform: the pistillum has an orbiculate germ, style cylindrical, and short, stigmas many (20), setaceous, of the length of the style: the pericarpium consists of arils not jointed, forming a flat ring, about a columnar receptacle: they are deciduous, and open on the inside: the seed is one, flat-kidney-shaped, in each aril.

There are several species, but those mostly cultivated are: *A. officinalis*, Common Marsh Mallow; 2. *A. cannabina*, Hemp-leaved Marsh Mallow; 3. *A. hirsuta*, Hairy Marsh Mallow.

The first species has a perennial root, and an annual stalk, growing erect, to the height of four or five feet, and putting out a few lateral branches. The leaves are soft, angular, and alternate. The flowers axillary, being shaped like those of the Mallow, but smaller and of a pale colour. They appear in June or July, and the seeds ripen in September. It grows naturally on salt marshes and the banks of rivers.

There is a variety of this with the leaves rounder, and not ending in a point; and another with lacinated leaves.

The second species has a woody stem, which rises to the height of four or five feet, and puts out many side branches. The leaves are alternate. The flowers axillary, not so large as those of the Common Marsh Mallow, but of a deeper red colour, and the calyx much larger. It seldom flowers the first year, unless the summer prove warm; but when the plants live through the

winter, they flower early the following summer, and produce good seeds. It grows naturally in Hungary.

The third is a low plant, the branches trailing on the ground. The leaves and stalks are beset with strong hairs; the flowers axillary, smaller than those of the common sort, and have purplish bottoms. The leaves are deeply cut into three parts, and have long petioles. The stalks are woody, but seldom last more than two years.

In all the species and varieties the roots are of the fibrous and perennial kind.

Culture.—The propagation in the first species may be effected with great facility, either by seeds or parting the roots. In the first method, the seeds should be sown in beds, or other situations where the soil inclines to moisture; as under such circumstances the plants grow to a larger size; but they will succeed in any kind of land. The latter mode is best performed in the autumnal season, as soon as possible after the stems decay; the roots being set out in similar situations to those employed for the seeds. If a number of the plants be set out together, as the roots spread much, they should not stand nearer than two feet.

The second species must be raised from seeds, which should be sown in the spring. They should, if possible, be sown in the situations where the plants are to remain; but if that cannot be the case, it is necessary that they be transplanted while very young, in order to secure their perfect growth. And that the plants may survive the severity of the winters in this climate, it is essential that they be set out in a dry soil and sheltered situation. They endure the cold better when planted in lime rubbish, or in soils that are of the more stony kinds; but the plants are not so perfect in their growth. The plants of this species seldom continue longer than two years in this climate. They must therefore be renewed from seed occasionally, which is easily done on account of its ripening well in this climate.

The third species should likewise be propagated by seed, which must be sown in the beginning of April, upon light, rather moist earth, in the situations where they are to remain; as from the roots of the plants shooting deep, they rarely succeed when transplanted, except it be performed while they are very young, and when the season is inclined to be moist.

These plants, from the singularity of their leaves, may be admitted in shrubbery and other compartments of gardens and pleasure-grounds, for the purpose of introducing variety among the herbaceous plants.

ALTHÆA *Frutex*. See HIBISCUS.

ALYSSUM, a genus which comprises several

species of under shrubby, herbaceous, perennial plants of the *Alysson* or *Madwort* kind; that are chiefly flowery and ornamental.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Silicquosæ*.

The characters of which are: that the calyx is a four-leaved, oblong perianthium, the leaflets ovate, oblong, obtuse, convergent, and deciduous: the corolla four-petalled and cruciform: the petals flat, shorter than the calyx, very spreading, having claws of the length of the calyx: the stamina have six filaments of the length of the calyx, two opposite, a little shorter, marked with a toothlet: antheræ from erect spreading: the pistillum has a sub-ovate germ, the style simple, of the length of the stamina, longer than the germ, and the stigma obtuse: the pericarpium is a subglobose, emarginate silicle, or broad and short pod, with a style of the length of the silicle, two-celled, the partitions elliptic, and hemispherical; the seeds are fixed to filiform receptacles issuing forth at the end of the silicle, few and orbicular.

There are many species, but those chiefly cultivated are: 1. *A. spinosum*, Thorny or Prickly Alysson; 2. *A. halimifolium*, Sweet or Sea Purslane-leaved Alysson; 3. *A. saxatile*, Yellow Rock Alysson; 4. *A. incanum*, Hoary Erect Alysson; 5. *A. calycinum*, Calycine Alysson; 6. *A. campestre*, Field Alysson; 7. *A. creticum*, Cretan Yellow Alysson; 8. *A. deltoideum*, Deltoid-leaved Alysson; 9. *A. montanum*, Mountain Dark-yellow Alysson.

The first species has woody branches, which rise about two feet high, and are armed with small spines. The leaves are hoary, lanceolate, and thinly placed on the stalks without any order. The flowers grow in small clusters at the extremities of the branches. The petals are white and entire, and the filaments toothless. It is a native of Italy.

The second species spreads itself upon the ground, and never rises to any height. The leaves are narrow, spear-shaped, pointed, and entire. At the extremities of its branches it produces very pretty tufts of small white-coloured flowers, of which the plant is seldom destitute for six or seven months together. In it the stamina are simple, and the silicles roundish and entire. It is a native of the southern countries of Europe.

The third is also a low plant, with a fleshy stalk, which seldom rises more than one foot high, but divides into many smaller branches, which grow near the ground, so that a single plant spreads to a considerable distance. The leaves are spear-shaped, soft waved and entire: the flowers produced in loose panicles at the extremity of every branch, and are of a bright yellow-colour.

They mostly appear about the end of April or beginning of May; and, if the season be moderate, continue three weeks or more in beauty. It is a small, showy, hardy plant, and not disposed to overrun others. It frequently flowers a second time in autumn.

The fourth species grows to the height of two feet, having woody stalks, which divide into several branches towards the top. The leaves are spear-shaped, hoary, and entire. At the extremity of every shoot the flowers are produced in round bunches; and are small and of a white colour. The silicle is entire, oval, and full of brown seeds. It grows naturally in the South of France.

The fifth is nearly of similar growth in the stem, and the leaves have much resemblance; but the four longer filaments are toothed in the middle within, and the two shorter ones put out from their base a lance-shaped scale, the length of the germ. The petals are very small, scarce apparently emarginate, yellow, but growing white with age. Silicle slightly emarginate, with two seeds in each cell. It is found wild in Austria.

The sixth is very like the last in stem, leaves, and petals, but is more decumbent, and has lance-ovate leaves. The filaments have no teeth, but the two solitary ones have a bristle on each side, not growing to the filament, but inserted into the receptacle. Silicles ovate, scarcely compressed, more downy. It is found in France, &c.

The seventh species grows more erect, having a shrubby stalk, which sends out a few lateral branches towards the top, with oblong hoary leaves. The flowers grow in small clusters at the extremities of the branches. It seldom continues longer than two years in England; and in a warm, dry situation, will live in the open air. It is found in Spain, &c.

In the eighth, the stems are woody, filiform, diffused, and hairy, the older ones having the bases of the petioles toothleted, and are flexuose. The leaves are lanceolate, with a strong angle or two on each side, as it were deltoid, green, with a few hairs. The raceme is simple, few-flowered: the flowers resemble those of the Stock Gillflower, and are of a purple colour: the calyx is oblong, closed, and gibbous at the base. It has been found in the Levant.

In the ninth species, the branches are trailing: the leaves oblong, hoary, rough to the touch, and alternate. The flowers are produced in small clusters at the extremities of the branches, and are of a dark yellow colour. Four of the filaments are bifid at the top; the two others have a toothlet at the base. It grows naturally upon rocks in Burgundy, and some other parts of France, &c.

Culture.—The propagation of these plants may be effected in different ways. It may be accomplished in all the sorts by means of seeds; and in most of the kinds by slips and cuttings from the shoots. In the first method, the seeds should be sown upon a border of rather poor, dry, light earth, about the beginning of April, being lightly raked in. When sown on rich soils the plants seldom survive the winter in this climate; but if they be put in on such as are of a dry, rocky, or gravelly nature, and of a bad poor quality, they not only withstand the cold better, but continue much longer, as they are less succulent, and of course less affected by frosts in the winter season.

In this mode of sowing, the plants will be ready to be transplanted in the beginning of the following autumn. The business should be performed when the weather is not too moist.

As the second kind rarely continues more than two or three years in this climate, it must be often sown to preserve it; but where the seeds are suffered to fall and remain upon the ground, the plants often rise without any trouble or difficulty.

In the third sort the seeds mostly ripen in July; but it is only from the young plants that they can be expected, as the old ones, or those which are raised from slips or cuttings, rarely produce any in this climate.

The fourth kind mostly flowers from June to September, and the seeds ripen soon after; which, if they be permitted to scatter, the plants will come up, and require little care or trouble afterwards.

The fifth and sixth sorts should always be sown where they are to remain; and if they be thinned and kept clean from weeds, they will flower in July, and perfect their seeds in autumn.

But the seeds in the seventh sort should be sown in August, soon after they are ripe; and where a few of the plants are potted in October, and sheltered under a frame in winter, they will flower the following June, by which means good seeds may be obtained the same year; as those plants, which arise early in the year, grow luxuriantly in summer, but do not often ripen seeds, or live through the winter season.

In the second and third methods, or those by slips and cuttings, the sets are best put in on dry borders about the latter end of April or beginning of May, the mould being applied closely round them. They should afterwards be shaded in the heat of the day, and watered occasionally till they have stricken root.

The eighth sort, as it rarely produces seed in this climate, may be best propagated from its trailing branches, which, if planted in April, will take root and become good plants by the follow-

ing autumn, when two or three of them may be placed in a common frame for shelter in winter, in order to preserve the species; as in hard winters, those which are exposed are sometimes destroyed.

This is properly a rock plant, being hardy, and forming with very little care a neat tuft of flowers, and is not apt to encroach on its neighbours. It is valuable as an ornamental plant from its beginning to flower in March, and continuing through the summer. All these plants may be employed in borders for the purpose of affording variety, and some of them in the way of adorning rock-works.

AMARANTHUS, a genus comprising many plants of the *Prince's Feather* kind. They are universally herbaceous annuals, several of them being highly beautiful and curious. They are likewise sometimes distinguished by the titles of Flower Gentle, Love-lies-bleeding, &c.

It belongs to the class and order *Monœcia Pentandria*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that those species which have male flowers on the same plants with the females have a calyx, which is a five- or three-leaved perianthium, upright, coloured, and permanent; the leaflets lanceolate, and acute: no corolla: the stamina have five or three capillary filaments, from upright patulous, of the length of the calyx, the antheræ oblong and versatile. Of those which have female flowers in the same raceme with the males, the calyx is a perianthium the same with the former: no corolla: the pistillum has an ovate germ; the styles three, short and subulate: stigmas simple and permanent: the pericarpium is an ovate capsule, somewhat compressed, as is also the calyx on which it is placed, coloured, and of the same size; three-beaked, one-celled, cut open transversely: the seed is single, globular, compressed, and large.

The species that demand attention for the purpose of cultivation are very numerous, but those most generally cultivated are: 1. *A. melancholicus*, Two-coloured Amaranthus; 2. *A. tricolor*, Three-coloured Amaranthus; 3. *A. sanguineus*, Spreading or Bloody Amaranthus; 4. *A. caudatus*, Pendulous Amaranthus, or Love-lies-bleeding; 5. *A. maximus*, Tree Amaranthus; 6. *A. cruentus*, Various-leaved Amaranthus; 7. *A. hypochondriacus*, Prince's-feather Amaranthus.

The first, or Two-coloured Amaranthus, has the stem upright, half a foot high, dark purple, smooth, streaked, and simple: the leaves are blunt, wrinkled, waved, emarginate, mucronate, with a short white point; the lower ones rufous liver-coloured on the upper surface, bright purple on the lower,

with elevated veins: the upper ones green, with red tips: the petioles channelled, bright purple, smooth, edged at top with the decreasing leaf: the lower ones nearly the length of the leaves: the glomerules subsessile, dark purple, on a very short undivided peduncle: the calyxes five-leaved: the leaflets oblong, purple, membranaceous, ending in a dark red point. Professor Martyn observes that this species varies in the colour of the leaves; as in the open air they are of a dirty purple on their upper surface, and in the younger ones green; while in the stove the whole plant is of a fine purple colour. It is, however, easily distinguished in all states by its colour, its leaves, and the lateness of its flowering, which is after all the others are past. It is a native of Guiana and the East Indies. Mr. Miller remarks that it grows to the same height with the Tricolor, and in the manner of its growth greatly resembles it; but that the leaves have only two colours, an obscure purple and a bright crimson, so blended as to set off each other, making a fine appearance when the plants are vigorous.

The second species, or Three-coloured Amaranthus, has the stem a foot and half or two feet in height, obscurely angular, smooth, and upright: the leaves blue with a red point, smooth, and waved: the younger ones red with yellow tips: those in a more mature state coralled at the base, violet in the middle, and green at the end: the old ones green with a violet base: the petioles very long, smooth, green, channelled, and bordered: the glomerules geminate, green, axillary: the calyxes three-leaved: the leaflets oblong, acuminate, membranaceous, with a green nerve. It varies in the colour of the leaves, which are less painted in the open air than in the stove. It has been long cultivated for the beauty of its variegated leaves, in which the colours are elegantly mixed. When the plant is in full vigour these are large, and closely set from the bottom to the top of the stalk: the branches also form a sort of pyramid; so that there is scarcely a more handsome plant when it is in full lustre. It flowers from June to September. And it is a native of Guiana.

The third, or Bloody-leaved Amaranthus, has the stem upright, four feet high, firm, red, round, and streaked: the leaves somewhat convex, or rather so contracted as to have the form of a boat, and pointed; the older ones rather blunt: the upper surface is a mixture of red and green, the lower more or less purple: the petioles are tinged with purple, channelled, roughish; winged at top with the leaf: the racemes very red: the branches smooth, the lower one spreading: the calyxes five-leaved: leaflets oblong, blunt, membranaceous, and red: the bractæ sub-

lato-setaceous, red, longer than the flowers, closely surrounding the glomerules.

The fourth species, or Pendulous *Amaranthus*, has the stem generally two feet high, green, obscurely angular, grooved and streaked, smooth, covered at top with thin, whitish, scattered hairs: the upper part nods on account of the great length of the racemes: the leaves are smooth, bright green, blunt, emarginate, with an incurved transparent point: the petioles much shorter than the leaf: the racemes terminating, elegantly purple, very long, cylindrical, composed of flowers very closely glomerate: the calyxes five-leaved: the leaflets oblong, red, acuminate, membranaceous: the bractæe oblong, pointed, and scattered.

The fifth, or Tree *Amaranthus*, rises to the height of seven or eight feet, sending off numerous horizontal branches at every ten or twelve inches: the leaves are rough, green, and luxuriant: the spikes are seldom half the length of those of the other sorts, but are much thicker. It is said to degenerate gradually into the smaller kind. The seeds, which at first are white, also become red. It flowers in August and September. And it is a native of Persia, &c.

In the sixth species, the stem is a foot and a half or two feet in height, grooved, green with red streaks, smooth, and slightly pubescent among the flowers: the leaves are green, spotted with brown above, red beneath, bluntish with a reddish short point: the petioles red, channelled, and smooth: the racemes red and green, with branchlets spreading and nodding a little: the calyx five-leaved: the leaflets oblong, pointed, white-membranaceous, with a red nerve, and a point of the same colour.

It varies of a shining red colour,—with a red stalk with pale leaves,—with a green stalk with variegated leaves, &c. As first cultivated in this climate, according to professor Martyn, the stem was wholly red and smooth: the petioles, ribs, and nerves of the leaves underneath purple; the spikes purple, much spreading, and a little nodding. They were of course very beautiful, and made a gay appearance for the two first years: but afterwards the seeds degenerated, and the plants had little beauty; which is the same with some other species of this genus. It is a native of the East Indies.

In the seventh species, the stem is erect, a foot and a half or two feet in height, smooth, except under the leaves, where it is a little scabrous, reddish, roundish, streaked, and grooved: the leaves are red and green, acute, with elevated veins: the petioles are channelled, and of a reddish colour: the racemes are naked, red, lateral, short, and placed about the stem without order:

the calyxes are five-leaved: the leaflets oblong, acute, membranaceous, and red.

It varies with leaves more or less red,—with very red and paler racemes,—with a green and red,—with a rough and smooth stalk. It flowers from July to September. And it is a native of Virginia.

Culture.—The propagation in most of these species is not effected without considerable trouble, as they require the aid of artificial heat, in order to bring them forward in the greatest perfection. There are a few, however, that may be raised in the open ground without the assistance of heat applied in the above manner.

The two first, as being the most tender, demand much greater attention and more artificial heat in producing them, than those of the third, fourth, and fifth kinds. And the sixth and seventh species are capable of being raised with still less heat than those of the above sorts, though not in the fullest perfection without a slight degree of it.

In all the different species the business is accomplished by sowing the seeds annually in the early spring months, as about the latter end of March or beginning of April, on beds of good earth, either over heat or in the natural ground, according to the nature of the plants. The earlier the sowing can be performed, the better growth the plants will attain in the summer season.

In raising the two first sorts in the greatest lustre and perfection, the aid of two or three different hot-beds is necessary; which should be covered with frames and glasses, so as to slide with ease and convenience. The first of these hot-beds should be small, and made in the ordinary way, for the purpose of receiving the seed, and which may likewise serve for that of other annuals of the tender kind of similar growth. They should be earthed over the top within the frames, to the depth of five or six inches, with good light dry mould. In this the seed should be sown in small shallow drills, and covered over very lightly with fine sifted mould: the glasses are then to be placed over. In these situations the plants should be suffered to remain till they have attained the height of two or three inches, air being admitted in fine days, and the glasses covered at nights with garden mats. When the plants are in this situation, a second hot-bed is to be prepared in the same manner, into which the young plants are to be pricked out to the distance of about four inches from each other, moderate waterings being occasionally given, and the plants well shaded from the sun till they have taken fresh root. Air should now be admitted more freely when the weather is fine, by raising one end of the glasses, and the night

coverings be carefully applied. After the plants have remained in these beds a month or six weeks, and are become tolerably strong in their growth, so as to require more space, the final hot-beds should be made ready. These ought to be of much larger dimensions. When the frames are placed over them, earth to the depth of four or five inches should be laid over; and the plants, after being taken up with balls of earth about their roots, planted in pots of about the twenty-fourth size, water being immediately applied in a sparing manner, and the pots plunged in the earth of the beds, the frames being raised occasionally, as the plants advance in growth. The lights are to be constantly kept on, but air freely admitted by raising the ends daily, and water applied every day or two. Towards the end of June the plants will have risen to nearly their full size; when they may be placed out in the open air, where they are fully seen when the weather is fine and settled, each of them being supported by a handsome stick.

In their after culture, they require to be kept constantly in the pots, and to have water freely applied almost every day when the season is hot. See ANNUAL PLANTS.

In order to procure the seed of these kinds in perfection, it is the best method to put a few of the best plants in a deep frame towards the latter end of the summer, that they may, by being more perfectly sheltered by the glasses, be rendered more fully ripe.

In the culture of the third and fourth sorts, as they are more hardy, one or two moderate hot-beds at most will be fully sufficient for raising the plants. In these cases, the seeds should be sown upon a moderate hot-bed towards the end of March; and when the plants come up they should have a considerable share of air admitted to them in mild weather, in order to prevent their drawing up in too weak a state: and when they are become large enough to be transplanted out, another moderate hot-bed should be provided, into which they should be removed, placing them at six inches distance in every direction, care being taken to water them as well as to shade them from the sun in hot weather, until they have taken new root: after which the air should be freely admitted to them at all times when the season is favourable. Their waterings should likewise be frequent, but not given in too great quantity at a time. As the plants advance in growth, and the warmth of the season increases, they should have a greater proportion of air, that by degrees they may be hardened so as to bear the open exposure. In the beginning of June the plants may be taken up with large balls of earth about their roots, and planted some into pots,

and others in the borders or other parts of the pleasure-grounds, shading them carefully until they have taken good root: after which they should be frequently watered in hot dry weather, especially those in the pots; as every evening or oftener.

As the Tree *Amaranthus* does not thrive well in pots, it should be planted in a rich light soil, and be allowed plenty of room, and a full supply of water, as often as may be necessary. In these circumstances it frequently attains a considerable size, especially in dry seasons.

The two last species are capable of being raised upon warm dry borders with tolerable facility; but they neither attain the full growth, afford such large flower-spikes, or appear in such early perfection, as when managed in the manner of the above.

In preserving the seed of the last five sorts, some of the largest and finest spikes should be collected, as they ripen, towards the latter end of September, and exposed to the full sun in some dry airy situation until they become perfectly dry, when the seeds may be rubbed out and put by in a dry warm place.

Persons who are curious in raising these annual plants in great perfection, find it convenient to have a glass case erected, with upright sloping glasses on every side, having a pit in the bottom for tan, in which the pots are plunged. If this be raised eight or nine feet to the ridge, and the upright glasses are five feet, there will be room and light enough to raise these as well as many other plants of a similar growth to great perfection: and, by such a contrivance, many of those tender annual plants, which rarely perfect seeds in this climate under other circumstances, may be brought forward so as to ripen their seeds in a perfect manner.

All these plants are highly ornamental, the more tender sorts being mostly distributed in mixture with others of the showy kinds in places immediately about the house; while those that are more hardy afford much ornament and variety in the borders, clumps, and other situations in gardens or pleasure-grounds. They should have rather open exposures, and be distributed towards the fronts, especially those of the low growing kinds.

AMARANTHUS, *Cocks-comb*. See CELOSIA.

AMARANTHUS, *Globe*. See GOMPHRENA.

AMARYLLIS, a genus comprehending several species of the *Lily-Daffodil* kind of plants; all of which are of the bulbous-rooted tribe, and mostly ornamental.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceae*.

The characters are : that the calyx is a spathe, oblong, obtuse, compressed, emarginate, gaping on the flat side, and withering : the corolla has six petals, lanceolate : the nectary has six very short scales, without the base of the filaments : the stamina have six awl-shaped filaments, with oblong, incumbent, rising antheræ : the pistillum has a roundish, furrowed, inferior germ, the style filiform, almost of the length and in the situation of the stamina : the stigma trifid and slender : the pericarpium is a subovate, three-celled capsule, and the seeds are several. The inflection of the petals, stamina, and pistillum, is very various in the different species of this genus ; and the corolla in most of the species is rather hexapetaloid than six-petalled.

The species are very numerous, but those principally cultivated are : 1. *A. lutea*, Yellow Amaryllis, or Autumnal Narcissus ; 2. *A. Atamasco*, Atamasco Lily ; 3. *A. formosissima*, Jacobæa Lily ; 4. *A. Regineæ*, Mexican Lily ; 5. *A. purpurea*, Purple-flowered Amaryllis ; 6. *A. Belladonna*, Belladonna Lily ; 7. *A. vittata*, Superb or Ribband Amaryllis ; 8. *A. longifolia*, Long-leaved Amaryllis ; 9. *A. orientalis*, Broad-leaved African Amaryllis ; 10. *A. Sarniensis*, Guernsey Lily ; 11. *A. Zeylanica*, Ceylon Lily ; 12. *A. latifolia*, Broad-leaved Amaryllis.

In the first species, or Yellow Amaryllis, the flower-stems seldom rise above three or four inches in height : the flowers are shaped somewhat like those of the Large Yellow Crocus, one coming up from each sheath : the leaves are green, and come up at the same time, like the Saffron ; and after the flowers are past, they increase all the winter. The roots are shaped like those of the Narcissus. It flowers in September, and is a native of the South of France.

The second species, or Atamasco Lily, has the flowers at their first appearance of a fine carnation colour on the outside, but which fade till they are almost white. They are nearly as large as those of the Small Orange Lily, but do not grow above six or eight inches in height. They appear about the end of May or beginning of June, and sometimes in August. It is a native of Virginia.

In the third, or Jacobæa Lily, the flower-stems are produced from the sides of the bulbs, so that after the flower produced on one side is decayed, another stalk arises from the other side of the bulb ; but there is usually no more than one flower produced on the same stalk. The flowers are large, and of a very deep red : the under petals are very large, and the whole flower stands nodding on one side of the stalk, making a most beautiful appearance. It is a native of South America.

The fourth, or Mexican Lily, has the bulb of a green colour ; the scape round, and sub-compressed. The corolla scarlet, with a bottom of a whitish green ; the three outer petals reversed at the tip, the three inner fringed at the base, the style red. The flower-stems seldom rise more than one foot in height ; each stem supports two, three, or four flowers, rarely more ; they are large, and of a bright copper-colour, inclining to red : the spathe, which covers the buds before they open, divides into two parts to the bottom, standing on each side the umbel of flowers, joined to the peduncles. It flowers constantly in the spring, when it is placed in a very warm stove ; and is in beauty in February ; those which are in a moderate temperature of air, flowering in March or April.

In the fifth the corolla is large, and of a blood-red, or purple-colour, and there are three or four large bell-shaped, rather erect flowers coming from each sheath. It is a native of the Cape of Good Hope.

The sixth, or Belladonna Lily, differs from the fourth species in having the edges of the petals waved, and not reversed at the tip. The scape is purple, sustaining from five to seven flowers, in shape like the Common Red Lily, and nearly as large, but of a soft purple colour, inclining to white on the inside toward the bottom, and having an agreeable scent. It usually flowers about the end of September, or the beginning of October, in this climate ; and if the roots are strong, the stems will rise upwards of two feet high. If the season is favourable, or the flowers be screened from frosts, violent winds and heavy rains, they continue in beauty a month or longer ; and are very ornamental plants at a season when there is a great scarcity of flowers. It is a native of the West Indies.

In the seventh, the petals uniting at bottom form a fleshy tube, but the edges of the outer ones are free at the base. It has been named *vittata*, from its ribband-like appearance, being striped with red on a white ground. The stem rises to the height of three feet or more, and produces from two to five beautiful flowers. It usually blossoms in April or May, but may be forwarded by artificial heat.

In the eighth species, the flower-stem rarely rises more than three or four inches in height, but supports a great number of flowers, of a deep purple-colour, appearing in December. The bulbs are large, and the leaves long and narrow. It flowers here in July, and is a native of the Cape of Good Hope.

In the ninth, or Broad-leaved African Amaryllis, the bulbs are large and almost round ; the leaves long, broad, and rounded at their extremities, spreading two ways on the surface of the

ground, and do not come up till after the flower-stem appears, which is generally in November; and after the flowers are past, the leaves increase till spring, and in May they begin to decay, so that from the middle of June to October the plant is void of leaves. It grows naturally at the Cape of Good Hope.

In the tenth species, or Guernsey Lily; the bulb is an oblong spheroid, flattened most at the lower end, six or seven inches round where thickest: the leaves are of a dark willow green colour, shining, from half an inch to three quarters of an inch in breadth, a little blunt at the end, from two to four in number, rarely five. The scape is flattened, twelve or fourteen inches in height, and more. The spathe splits, and falls back in two unequal pieces of a reddish colour and triangular figure. The pedicels are from an inch to almost two inches in length. The number of flowers commonly from eight to twelve, the circumference of each being about seven inches. The corolla, when in its prime, has the colour of a fine gold tissue wrought on a rose-coloured ground; and when it begins to fade, it is a pink: if beheld in a full sun-shine, it seems to be studded with diamonds, but by candle-light the specks or spangles look more like fine gold dust: when the petals begin to wither, they assume a deep crimson colour. The flowers begin to come out at the end of August, and the head is usually three weeks in gradually expanding itself. This beautiful plant is a native of Japan, and has been long naturalized in Guernsey.

The eleventh species has the stature of the *Crinum Americanum*. The leaves are fleshy, scabrous with a toothleted edge. The spathe bivalve, besides some interior scales or fragments. The germs are sessile. The tube of the corolla of the same colour with the scape, which is rufous. The border white, with lanceolate, recurved petals, with a red keel underneath. The filaments and style are of a blood-red colour, and the pericarps viviparous.

The twelfth has roots like the *Crinum* mentioned below: the leaves narrower at their base, and stained with purple on their under side; the scapes purple, and growing to the same height as those of the *Crinum Asiaticum*; the flowers of the same shape, but the tube purple, and the segments having a purple stripe running through them: the stamina are also purple; it is however more beautiful than that plant. This is a native of the East Indies.

Culture.—In all the different sorts, the propagation is performed by the small bulbs or offsets that are removed from the sides of the old roots every year at the time they are transplanted. Some of the sorts, as the first and

second, are often capable of being raised on dry warm borders; but most of the others stand in need of artificial heat to raise them in the most perfect manner.

They all delight in a loose, sandy, dry soil, that contains a good proportion of vegetable mould; and require but little water, except where the roots are in a high state of growth and sending forth their flower-stems; when they should have it frequently in small quantities. When applied under other circumstances, it is apt to rot and destroy the bulbs.

All the more tender sorts should be put in pots, and placed in stoves, where they must be constantly kept; as much air as possible being admitted to them during the hot summer months. Some of them are, however, capable of bearing the open air at this season: but in this method of management they neither grow so well, or flower so regularly, as in the stove mode of treatment.

The most suitable season for transplanting the roots of all the different species, is at the time when their leaves are wholly destroyed, as about the latter end of July, or the beginning of the following month, before they begin to send forth new root-fibres, as after that has taken place they are liable to be greatly injured by being removed from their situations.

The first kind, or Yellow Autumnal *Amaryllis*, is a hardy plant, and may be increased with great facility by offsets from the roots. The best season for transplanting the root-bulbs of this sort is any time from May to the end of July, when their leaves are decayed: but after that period it will be too late to remove them, as they mostly begin to push out fresh root-fibres about the middle of August or sooner, if the season be moist and warm, frequently flowering the beginning of September; so that, if the business of transplanting be performed so late as this, it will spoil their flowering. This plant is capable of growing in any soil or situation; but it thrives to the best advantage in those of the above kind, when sufficiently fresh and light, and in open situations, that are not under the dripping of trees, or too near walls, or other tall fences that produce much shade. Miller observes that it is commonly known to gardeners by the name of Yellow Autumnal *Narcissus*; and usually sold by them with *Calchicums* for autumnal ornaments to gardens; for which purpose it is a pretty plant, as it will frequently keep flowering from the beginning of September to the middle of November, in case the frost is not so severe as to destroy the flowers; for though there is but one flower in each cover, a succession of flowers is produced from the same root, especially when they are suffered to

remain three or four years without being removed.

A dry warm border is the best exposure for this sort.

The second species, or Atamasco Lily, is also so hardy as to thrive in the open air in this climate, when the root-bulbs are planted out in a warm situation and on a dry soil: it is likewise best propagated by offsets from the root-bulbs of the old plants. As very severe frost is liable to destroy the bulbs in some cases, a few should always be planted in pots, in order that they may be protected in the winter season.

The third sort, or Jacobæa Lily, is of the more tender kind, but is now become common in the gardens of the curious in this country. The root-bulbs send forth plenty of offsets, especially when they are kept in a moderate warmth in the winter season: for the roots of this kind will live in a good greenhouse, or they may be preserved through the winter under a common hot-bed frame; but in this way they do not flower so often, or send out so many offsets, as when they are placed in a moderate stove in that season. This sort produces its flowers two or three times in the year: it is not however regular to any season; but the flowers are mostly produced from March to the beginning of September, when the roots are in a vigorous state of growth. It is best propagated by offsets from the old root-bulbs, which may be taken off every year: the most proper time to part and shift the roots in this kind is in August, as by this means they may take good root before the winter sets in. In doing this care should be taken not to break off the fibres from their roots. They should be planted out separately in pots of a middling size, and be kept in a moderate degree of warmth in the stove, as by that means they produce their flowers in greater plenty, and the roots make a greater increase, than where they are managed in a more hardy manner.

The fourth sort, or Mexican Lily, is not so hardy as either the above or the Belladonna Lily; it must of course be placed in a stove of much greater warmth; and if the pots are plunged into a hot-bed of tanner's bark, the roots will thrive better, and the flowers be stronger.

It is increased by offsets from the old root, in the same manner as the other sorts, and usually flowers in the beginning of the spring, when it produces a fine appearance in the stove with others of similar growths.

The fifth species, or Purple-flowered Amaryllis, is likewise of the tender kind, and is capable of being propagated in the same manner as the above. It also succeeds the best, and flowers to the greatest advantage and effect, when con-

stantly kept in the stove in a similar degree of temperature with that of the above species.

The sixth kind, or Belladonna Lily, is more hardy. It has been cultivated, according to the editor of Miller's Dictionary, with great success in the following manner:—A border was prepared close to a wall which had a south-west aspect, about six feet in width, in this manner. All the earth to the depth of three feet was removed, and some very rotten dung put in the bottom six inches thick, upon which light garden mould was applied, about twenty inches in depth. After making this level, the roots were placed at six inches' distance every way, being then covered over with light sandy earth, to the height of the border; by which means the upper parts of the roots are five or six inches buried. In the winter season the border was covered all over with rotten tanner's bark, to the depth of three inches, in order to prevent the frost from penetrating the ground. And when it proved very severe, some mats or straw were laid over the leaves to protect the plants from being destroyed. In this management the roots have greatly increased and the plants have constantly flowered every year; some of them having put out two or three stems which grew near three feet in height, producing many flowers in each umbel, which made a fine appearance during the month of October. It is added, that the green leaves come up soon after, and abide all the winter and spring until June, at which time they decay. Soon after this period the roots should therefore be transplanted; for, if they are suffered to stand till July, they will have sent forth new root-fibres, in which state it would greatly injure the roots if they were disturbed. If some of the roots be planted in a warm border close to a south wall, and in a dry soil, they mostly thrive well, especially if they be covered in severe weather; and these roots generally flower much stronger than those which are kept in pots, and multiply faster than under other circumstances.

The seventh species is more tender than the above, as it rarely puts forth offsets from the roots. But as it produces ripe seeds in sufficient quantity, it may be propagated in that way without much difficulty. These should be sown in pots of good mould in the spring season, and immediately afterwards plunged into a bark bed of moderate temperature, a little water being occasionally given till the plants appear, and become of sufficient growth to be transplanted out into separate pots, which should be performed in a careful manner, and a little water given immediately afterwards, the pots being directly placed in the stove, where they are to be constantly kept, as in the above kinds.

The eighth sort is likewise tender. It requires to be treated in the same manner as the *Jacobæa Lily*. It is found to increase pretty fast by offsets. When properly managed, it usually flowers in the winter season, especially if the pots be placed in a stove of moderate temperature; and as at this period there are but few flowers in the open air, it is more valuable on that account as an ornamental plant for the stove.

The ninth species is still more tender: it must of course be placed, during the winter season, in a stove where there is a moderate share of warmth; but it should not have so much water as the *Jacobæa Lily*. It may be raised from offsets.

The tenth species, or *Guernsey Lily*, is supposed to have come originally from Japan; but has been long cultivated in the gardens of *Guernsey* and *Jersey*; in both of which it seems to thrive and succeed as well as if it were in its native soil. From those islands its roots are annually sent to the curious in different parts of Europe.

The root-bulbs are generally sent to us in June and July; but the sooner the bulbs are taken out of the ground, after their leaves decay, the better they are; for though the roots, which are taken up when their flower-stems begin to appear, may flower, their flowers are not so large, or their roots so good afterwards, as those which are removed before they have sent out fresh root-fibres.

On obtaining the roots, they should be planted in pots filled with fresh, light, sandy earth, well mixed with a little very rotten dung, to the depth of two or three inches, and then placed in a warm situation; or what is better, in a moderate stove-heat, the earth being refreshed with water occasionally; but they should not have too much, as it would rot their roots, especially before the stems rise. About the middle of September, the more vigorous roots will begin to show the buds of their flower-stems, which are commonly of a colour; therefore these pots should be removed into a situation where they may have the benefit of the sun, and be sheltered from wet, strong winds; but by no means too near a wall, or under glasses, which would draw them weak, and render them less beautiful in their bloom. At this season they should be gently watered with water occasionally, when the weather is warm and dry.

As soon as the flowers begin to open, the pots should be removed from the open air, to prevent the flowers from being injured by too much moisture; but they must not be kept too close, or be placed in situations too warm, as they would occasion their colour to be less lively, and hasten their decay. The flowers of this plant often

continue in beauty, when managed in the above manner, a full month: and though they have no scent, from the richness of their colour, they are justly esteemed as flowery ornamental plants.

When the flowers are decayed, the leaves begin to shoot forth in length, and, if sheltered from severe cold, continue growing all the winter season; but they must have as much free air as possible in mild weather, and be covered only in severe rains or frosts; for which purpose a common hot-bed frame is the best, as the glasses may be taken off constantly every day in dry open weather, which will encourage the leaves to grow strong and broad; whereas, when they are placed in a greenhouse, or not exposed to the open air, they are apt to grow long and slender, and have a pale weak aspect, by which the roots become weak, seldom producing good flowers.

The roots should be transplanted every fourth or fifth year, about the latter end of June or beginning of July, into fresh earth; but not oftener removed, as that would retard their flowering.

The offsets may also be taken off, and planted out into different pots; which, in three years time, mostly produce flowers. Consequently, after a person is once stocked with these roots, he may increase them, so as to have a constant supply of blowing roots, without being at the trouble or expense of sending to the above places annually for them; and the roots, thus preserved, will flower stronger than those which are brought from thence, as the inhabitants of those islands are not very curious in cultivating them;—their usual method, according to Miller, being to plant them at a great distance in beds of common earth, where they let them remain for many years; in the course of which they produce such a number of offsets that one single cluster has frequently contained above a hundred roots; by which means those which grow on the inside are so much compressed by the outer roots, that they are perfectly flattened: and from the number of roots growing in each cluster, they are all rendered weak, and unfit to produce such large stems of flowers as those which have grown singly and are of a spherical form. As when a person is possessed of a great number of these roots, it will be troublesome to preserve them in pots, a bed should be prepared in the following manner, in some well sheltered part of the garden. In doing this, a third part of fresh virgin earth, from a pasture ground, which is light, should be provided, with an equal portion of sea-sand, to which should be added rotten dung and sifted lime rubbish, of each an equal quantity. With this earth, when well mixed and incorporated, a bed should be made about two feet thick, raising it about four or five inches above the surface of the ground,

where the situation is dry; but where the ground is wet, it should be raised eight or nine inches higher. In this bed, about the beginning of July, as before directed, plant the roots about six or eight inches asunder each way; and in the winter, when the frost begins, cover the bed with a frame, or arch it over, and cover it with mats and straw, to prevent their leaves from being pinched by cold. In the spring, the covering should be entirely removed, and the bed kept constantly clean from weeds during the summer, stirring the surface of the earth now and then; and annually, when the leaves are decayed, sift a little fresh earth over them, to encourage the growth of the roots.

The roots may remain in these beds until they are of sufficient strength to produce flowers, at which time they may be taken up and planted in pots, as before directed, or be suffered to remain in the same beds to flower. These plants do not flower again the succeeding year, as in many other sorts of bulbous-rooted plants; but where the bulbs contain two buds in their centres, as is often the case, they frequently flower twice in the course of about three years; after which the same individual root-bulb does not flower again in several years; but this is performed by the offsets, which are taken from it at different times.

The eleventh species, or Ceylon Lily, is of a tender nature, and must be treated in the same manner as the Mexican Lily. It is not common in the gardens in this country, as it is a plant which increases but slowly by offsets from the roots. It usually flowers in June and July; and sometimes the same plant will produce flowers again in autumn if the pots be plunged into a bed of tanners' bark; but the flowers are seldom of long duration or great beauty.

The twelfth species is also of the tender kind, but may be increased by offsets from the roots, or by the bulbs which succeed the flowers. It should be treated in the same manner as is directed for the *Crinum*; the proper culture of which may be seen under that head.

All these bulbous-rooted plants, as being both curious and ornamental, deserve to be cultivated; those of the more tender kinds affording much variety in the stove or greenhouse; while the more hardy sorts produce a pleasing effect in the fronts of beds or borders in the garden or pleasure-grounds.

AMBER TREE. See *ANTHOSPERMUM*.

AMBROSIA, a genus comprising different plants, chiefly of the herbaceous kind.

It belongs to the class and order *Monœcia Pentandria*, and ranks in the natural order of *Compositæ*.

The characters are: that the male flowers are compound: the calyx is a common, one-leaved, flat perianthium, of the same length with the floscules: the corolla compound, uniform, tubulous, equal, and hemispherical: proper, one-petalled, tubulous, funnel-shaped, erect, quinquefid: the stamina have very small filaments: antheræ erect, parallel, and acuminate: the pistillum has a filiform style, of the length of the stamina: the stigma is orbiculate and membranaceous: the receptacle is common, scarcely any, naked. The female flowers are below the males, and double: the calyx is a one-leaved, acuminate, entire, permanent perianthium; the belly five-toothed, and one-flowered: no corolla: the pistillum is a germ ovate in the bottom of the calyx: the style filiform, of the same length with the calyx: stigmas two, setaceous, long, and divaricated: the pericarpium is a subovate nut, formed from the calyx, hardened, one-celled, not opening, crowned with the five acuminate teeth of the calyx: the seed single and roundish.

The species chiefly cultivated are: 1. *A. elatior*, Tall Ambrosia; 2. *A. arborescens*, Tree Ambrosia; 3. *A. maritima*, Sea Ambrosia.

The first species, or Tall Ambrosia, rises from two to three feet in height, upright and branched. The leaves are bipinnatifid, with a very long point, nerved, wrinkled, somewhat hirsute: the racemes composed of opposite branches, from four to six inches in length, lax, and rather erect. The male flowers are more numerous, approximating, and nodding: the perianthium is common, five-toothed, cup-shaped, with very minute florets in it: proper, extremely small, five-cleft: the corolla five-parted, the size of the calyx, with ovate, acute segments: the filaments are five: the antheræ are oblong; the rudiment of a pistil: five or six smaller flowers in the ray: their calyx five-cleft: their corolla consisting of five linear petals; no pistil, germ, or pericarp, but an upright, thick, pellucid style, with a pencil-shaped stigma. The female flowers are fewer, sessile, from three to six, and aggregate: the calyx none, except the minute lanceolate leaflets between the germs: the germ oblong, angular: the style two-parted: the stigmas recurved and simple.

This is an annual herbaceous plant: It is a native of Jamaica; and flowers with us in July and August.

The second species grows to the height of ten or twelve feet, with a woody stem, dividing into several branches: the leaves are hairy, composed of several winged lobes, placed alternately: the spikes of flowers are single, hairy, and produced at the extremities of the branches. The female flowers grow in small separate clusters very distinct.

The third species rises about two feet and a

half high: the stems are hairy: the leaves very soft and pubescent; and, upon being handled, emit a strong odour: the spikes of flowers are axillary: the racemes close: the male flowers subsessile: the spike not sitting on a long peduncle, as in the above sort.

Culture.—These plants are raised either from seeds or cuttings, according to the kinds. The soils most adapted to their culture are those that are of the more poor, but moist sort.

The plants in the first species are capable of coming up and thriving well in the open air in this climate; but when so raised do not produce good seeds, unless the season be warm: therefore to have them good every year, it is necessary to cultivate them in a different manner. They should be sown on a moderate hot-bed in March; and when the plants are come up two inches high, be transplanted into another moderate hot-bed, allowing each plant three or four inches square; taking care to water and shade them pretty well, until they have taken new root: they should afterwards have a large share of fresh air every day, when the weather is warm, and frequent waterings, as they are thirsty plants. When the plants are grown pretty strong, they may be taken up with balls of earth to their roots, and be planted in large pots filled with light earth; and if they are then placed on a very moderate hot-bed, till they are perfectly rooted, it will greatly forward their flowering. About the latter end of May, they should be placed in the open air with other hardy annual plants.

The second species is capable of being propagated either by cuttings or seeds; if by the former, they should be planted in a shady border in any of the summer months, and be frequently watered. In about a month or five weeks they will generally have formed good roots, and should then be taken up and potted; as when they are left longer in the open ground they are apt to grow too luxuriant, and not so soon recover their removal.

This sort is hardy enough to be exposed to the open air in summer; and in winter, if sheltered in a common greenhouse, it will live several years. In mild winters, the roots live in the full ground, in a warm border, but in severe frosts the plants are in danger of being destroyed.

As the seeds, when sown in the spring, seldom come up the same year, the autumn should be preferred, as they will then come up in the following spring.

As the third sort seldom perfects its seeds in this climate, unless the plants are brought forward by heat in the spring, they should be sown in the autumn in a warm border; and when the plants come up in the spring, be transplanted in-

to another warm border of poor ground; as when they are put into rich moist land, they grow too luxuriantly, and do not flower till late in the season. The best method to obtain good seeds is to plant some of them in lime-rubbish. The seeds of this sort are also capable of rising spontaneously. This is not a plant that possesses much beauty; but it may be admitted into gardens or other places for the sake of variety.

All these plants may be employed for the purpose of ornament in beds, or the borders of pleasure-grounds.

AMELLUS, a genus comprehending perennial exotic plants of the Star Flower kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositae Oppositifoliae*.

The characters of which are: that the calyx is common, imbricate and roundish; the scales linear and pressed close: the compound corolla is radiate: the corollets hermaphrodite, very many in the disk: females very many in the ray, proper; of the hermaphrodite tubulous, five-cleft: female ligulate, lax, two or three-toothed: the stamina in the hermaphrodites have five capillary, short filaments: the anther is cylindrical and tubulous: the pistillum in the hermaphrodites has an obovate germ: the style filiform, of the length of the stamina: the stigmas two, and filiform: females very like the hermaphrodites: no pericarpium: the calyx unchanged: seeds to the hermaphrodites solitary, obovate: down capillary: to the females very like the others: the receptacle chaffy.

The species cultivated are: 1. *A. lychnitis*, Trailing Amellus, or Star Flower; 2. *A. umbellatus*, Umbelled Amellus, or Star Flower.

The first of these species rises with a round, bushy, trailing stem, from two to three feet in height, sending out branches on every side, terminated by flower-stalks, each supporting one violet-coloured flower, with a yellow disk, shaped like those of the Aster; and appearing in July or August. The leaves are quite entire, sessile, roughish. The peduncles terminal, with one or two leaflets. It is a native of the Cape of Good Hope.

The second has upright, simple, round, hairy stems, two feet or at most two feet and a half in height. The leaves at first radical; but afterwards each stem is naked at bottom, petioled and wedge-shaped at the base; somewhat decurrent and serrate, nerved, smooth, dark green, white and soft beneath. The upper stem-leaves are on shorter petioles, and smaller. The stem towards the top is generally divided into three branches; each of which is subdivided into many small flower-branches, forming a sort of umbel.

The umbellules have from three to eight flowers, with linear leaflets, from two to four, under them. The peduncles an inch long, each sustaining one large yellow flower. The scales of the calyx are lanceolate, membranaceous, and hoary. The hermaphrodite corollets fewer in the disk, funnel-shaped, with a reflex border: the females in the ray numerous, linear, blunt, and bifid. The seeds to all the flowers are obconical. The down sessile, simple, and hairy. The receptacle hirsute, not bristly. It is a native of the island of Jamaica.

Culture.—These plants may be propagated either by cuttings or seeds, according to the kinds. In the first species it is best effected by cuttings made from the young shoots, which should be planted out in the early summer months on a bed of good earth, or in pots filled with good fresh mould, the earth being closely pressed round them. In either method a shady situation should be chosen; and in the former the young plants must be taken up with large balls of earth about their roots, and placed in pots of rather small sizes, in order that they may be more conveniently put in situations to be protected during the winter season. The plants mostly however succeed best when set out at first in pots, especially where proper attention is bestowed in giving them slight waterings occasionally, till they have stricken roots. If placed in a greenhouse, or common frame, of sufficient height, the plants will be prevented from being drawn up weak; and have more beauty, especially if plenty of sun be admitted when the weather is mild.

The second species is best raised by sowing the seeds in the early spring months, on a moderate hot-bed, covered two or three inches deep with fine sifted mould. When the plants are become sufficiently strong, they should be taken up and replanted in pots, two or three in each, a very little water applied, and the pots then plunged in a hot-bed of tanner's bark in the stove. In this method ripe seeds may be procured from them in the autumn: but where this mode of culture is not followed, the assistance of a stove in the winter season will be absolutely necessary.

The first sort may be employed in the garden or pleasure-ground as ornamental plants: and the latter, as being more tender, may serve for variety in the greenhouse or stove.

AMERICAN EARTHNUT. See ARACHIS.

AMERIMNUM, a genus comprehending plants of the exotic perennial shrub, and shrubby tree kinds, which are of tender growth.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionacea* or *Leguminosæ*.

The characters of which are: that the calyx is a one-leaved perianthium: the tube bell-shaped, five-toothed, the teeth sharp: the corolla papilionaceous: standard with an oblong claw, roundish, heart-shaped, expanding, and convex: wings lanceolate, shorter than the standard, and the keel short: the stamina have ten filaments, conjoined: antheræ roundish: the pistillum has a germ, pedicelled, oblong, compressed, leafy, and varicose, with lateral veins, within woody, not gaping: the cells disposed longitudinally within: the seeds solitary, kidney-shaped, thicker at the base, appendicled at the top.

The species are: 1. *A. Brownei*, Browne's Amerimnum; 2. *A. ebenus*, Prickly Amerimnum or Jamaica Ebony.

The first species is a shrub which rises commonly to the height of ten feet, and supports itself upon other shrubs. It divides into long, round branches, covered with a blackish bark, subdividing into a great number of alternate twigs. The leaves are quite entire, sharp, and shining, two or three inches in length. The common peduncles sustain about ten flowers; which are small, white, and have a very sweet scent. They come out in great abundance after the rainy season. The standard of the corolla, after fecundation, becomes erect; but before that takes place it spreads out wide. It is a native of the West India Islands, &c.

The second is a shrubby tree with a pretty thick stem, which rises twelve or fourteen feet high, covered with a rugged brown bark, and divides into many spreading branches, which grow almost horizontal; and are armed with short brown crooked spines. The leaves are small, stiff, and wedge-shaped, coming out in clusters, and sit close to the branches. The flowers come out upon slender foot-stalks from the side of the branches singly, and are of a bright yellow colour, being succeeded by compressed moon-shaped pods, which inclose a kidney-shaped seed.

Culture.—The first of these plants is capable of being raised by cuttings from the young twigs, which should be placed in pots of good mould in the early summer months, being then plunged into a good bark hot-bed, and very slight waterings occasionally given them. After the plants have taken root, they may be removed into the stove or greenhouse; and be managed in the same manner as is directed for the second kind.

The second species is best propagated by seeds, which must be procured from the places of its natural growth, as the plants do not produce seeds in this climate. They should be sown in pots filled with light fresh earth, in the early

spring months, and plunged into a good hot-bed of tanner's bark, or placed in tan, under pots, as their covers are very hard. The plants mostly appear in about six weeks, when they must be carefully treated, being very tender in their early growth; they should have fresh air admitted to them every day when the weather is warm, and be frequently refreshed with water when the earth in the pots becomes dry. In the course of five or six weeks after the plants appear they will be fit to transplant; in doing which, they should be carefully taken out of the pots and separated, planting each into a small pot filled with light rich earth, plunging them again into the hot-bed, carefully shading them from the sun daily, until they have taken root; after which they may be treated in the same manner as other very tender exotics, by giving them fresh air every day in warm weather, and watering them once in two or three days gently; and when the nights are cold, covering the glasses with mats. In this hot-bed the plants may remain till autumn, when they must be removed into the stove, and be plunged into the bark-bed.

At this time those plants whose roots have filled the pots should be carefully shifted into larger ones, before they are thus plunged: but as the plants are not of quick growth while young, they do not require to be often shifted out of their pots.

Through the whole of the winter season the plants must be kept warm, especially the first year, and have but little water, which in cold weather should be given in very small quantities. In case their leaves should be attacked by insects, they must be washed with a sponge to clear them, otherwise the plants will be much injured in their growth, and become unhealthy.

As these plants are very tender while young, they will not live in the open air in this climate, even in the warmest part of the year. They must of course be constantly kept plunged in the bark-bed, in the stove; in the summer season, when the weather is warm, admitting a large share of fresh air to the plants. In the second year, when the plants have attained sufficient strength, they may however be exposed for two or three months in a warm situation in the summer season.

According to Dr. Browné, the last sort is very common in Jamaica, and other places in the West Indies, where the wood is cut, and sent to this country under the title of *Ebony*, though it is not the true ebony, which is a native of the eastern country, and a plant that belongs to a different genus. The wood of the American Ebony is of a fine greenish brown colour, and polishing very well is in much esteem by the instrument-makers. It is of a very hard

durable nature: but the small dimensions of this tree render it fit only for few purposes; the trunk seldom exceeding three or four inches in diameter. The slender branches, being very tough and flexible, are frequently used for riding-switches.

These plants may be cultivated for the sake of curiosity and variety, among greenhouse and stove collections.

AMETHYSTEAE, a genus comprising a hardy annual plant of the flowery kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Verticillatæ*.

The characters are: that the calyx is a one-leaved perianthium: the tube bell-shaped angular, semiquinquefid, subequal, acuminate, and permanent: the corolla is one-petalled, ringent, little longer than the calyx: border five-parted, subequal: upper lip erect, rounded, concave, two-parted, gaping; lower three-parted, the sides rounded, erect, shorter; the middle quite entire, concave, the length of the upper lip: the stamina have filiform filaments, approximating under the upper lip, and longer than it: the antheræ simple and roundish: the pistillum is a quadrifid germ: the style the size of the stamens: stigmas two, and acute: no pericarpium; but the calyx becomes more bell-shaped and spreading: the seeds are four, shorter than the calyx, obtuse, and angular within.

The only species is the *A. cærulea*, or Blue Amethysteae.

It is a plant that has an upright stalk, which rises about a foot high: towards the top it puts out two or three small lateral branches, with small trifid leaves, sawed on their edges, of a very dark green colour. At the extremity of the branches the flowers are produced in small umbels, and are of a fine blue colour, as are also the upper part of the branches, and the leaves immediately under the umbel; so that although the flowers be small, from their colour, with that of the upper part of the stalks, the plants make a pretty appearance, during their continuance in flower.

The seed, when sown in the autumn, produces plants the following spring, which flower the beginning of June; but that which is sown in the spring does not flower till July. It is a native of Siberia.

Culture.—The propagation of this plant is effected without much difficulty by means of seed, which should constantly be sown in the autumn, as when this is deferred till the spring the plants do not flower so early in the summer, if at all; for where the season has proved dry they have been known to remain in the ground a whole year

without vegetating. As the plants do not succeed on being transplanted; the seeds should always be sown in places where they are to remain and flower, where the soil is rather inclined to be moist, or in pots filled with such sort of earth. After the plants have risen to some size, they should be thinned out when they stand too closely together, and be kept perfectly clear from weeds. In dry seasons water should be given them pretty frequently in slight proportions.

This is a plant that may be employed in the fronts of borders in gardens or pleasure-grounds, or to be set out in pots with others of the more hardy annual kind.

AMOMUM, a genus comprehending several tender, herbaceous, exotic plants of the Ginger kind.

It belongs to the class and order *Monandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters of which are: that the calyx is a one-leaved perianthium, cylindraceous, and unequally trifid: the corolla is monopetalous and funnel-shaped: the tube cylindraceous; the border three-parted, the parts oblong and spreading: the nectary two-leaved or two-lipped; the lower lip inserted under the upper segment of the corolla, spreading, almost erect, entire or three-lobed: the stamina have no filament except the upper lip of the nectary, which is smaller than the lower, and opposite to it, acuminate, or three-lobed at the tip; along the middle or at the end of which grows longitudinally a large oblong anther, geminate, or divided by a longitudinal furrow into two, which are one-valved: the pistillum has an inferior, oblong germ: the style filiform, drawn through the suture of the anther; the stigma turbinate, obtuse, and ciliate: the pericarpium a fleshy capsule, ovate, three-cornered, three-celled, and three-valved; the seeds are several, covered with a sort of berried aril.

The species chiefly cultivated in stoves in this climate are: 1. *A. Zinziber*, Common or Narrow-leaved Ginger; 2. *A. Zerumbet*, Broad-leaved Ginger; 3. *A. Cardamomum*, Cardamom.

In the first species the root is creeping, bipalmate, compressed; the fleshy tubers with age becoming fibrous. The culm annual, two feet in height, quite single, solid, and upright. The leaves are half a foot in length, smooth, narrow, alternate, on short embracing petioles. The scape separate, eight inches in height, thick, round, straight, scaly, and usually without leaves. The spike is upright, composed of large, ovate, subacuminate, coloured scales, half closing the flowers, which are of a blue colour. The calyx is a small, double spathe. The corolla yellowish green, with a long, slender tube; the segments of the border

conical, and nearly equal. The nectary is reddish brown, ovate, quite entire, petal-shaped, winged on each side at the base, somewhat shorter than the corolla, fastened to it below the anterior fissure of the segments. The filament (upper lip of the nectary) filiform, placed on the corolla, and shorter than it. The anther ovate, large, cloven longitudinally, embracing the filiform style. The stigma cylindraceous, and ciliate at the tip. The capsule smooth, containing many oblong seeds. It is a native of the East Indies, and flowers here in September.

The second species, or Broad-leaved Ginger, has the tubers of the root much larger, round, twisted, thick, branched, horizontal, pale-coloured, with but little smell, and a bitterish, not an ardent flavour like true Ginger. The culm four feet in height, perennial, straight, quite simple, round and solid, like the above species. The leaves are lanceolate, large, smooth, petioled, embracing, ascending obliquely. The scape a foot high, distinct, thick, scaly, red. The spike large, with rounded, close, one-flowered, red scales. The flowers of a white colour. The calyx a single acute spathe. The corolla pale, with a long tube: the upper segment of the border acute, the two lower ones subovate. The nectary of the same colour, petal-shaped, very blunt, bifid, fastened to the throat of the corolla. The filament flat, subulate, bent in, adhering to the hinder segment of the corolla, and nearly equal to it. The anther oblong, fastened to the middle of the filament. It is a native of the East Indies, and flowers here from September to November; when the stalks perish in the same manner as in the true Ginger.

The third species, or Cardamom, has thick fleshy roots, resembling those of the large Flag Iris; which in the spring send forth many green reed-like stalks, which rise to the height of seven or eight feet, garnished with very long narrow leaves, set alternately, closely embracing them at their base. The stalks decay entirely in autumn, and new ones arise from the roots in the spring, but it has not yet produced any flowers in this climate; though the roots thrive and increase greatly where they are managed in a proper manner.

According to Dr. Browne, the manner of preparing the Ginger root for use in the West Indies is this: When the stalks are wholly withered and the roots taken up, which is generally done as soon afterwards as possible, after being picked and cleared, they are gradually scalded in boiling water; they are then spread, and exposed to the sun till the whole is sufficiently cured; when they are divided into parcels of about one hundred weight each, and put into bags for the market; this is called black ginger. The white ginger is

never scalded, but every root is picked, washed, and scraped separately, and then dried in the sun and air very carefully.

In order to preserve this root in syrup, it is dug when the shoots do not exceed five or six inches in height. Being picked and washed, they are scalded till tender: then put into cold water, scraped and peeled gradually: this operation lasts three or four days, during which time the roots are constantly kept in water and frequently shifted. They are then put into jars, and covered with a thin syrup, which after two or three days is shifted, and a richer put on; this is sometimes again removed, and even a fourth put on; but it seldom requires more than three syrups. The shifted syrups are diluted, and fermented into a small pleasant liquor, called cool drink, which is in much use.

Culture.—These plants are easily propagated by parting their roots; which should be performed in the spring, before they put out new shoots; as they should not be transplanted in summer, when they are in full vigour, nor do they succeed well when they are removed in autumn, as they remain long after in an inactive state; and during that time, if wet stagnates about the roots, it often causes them to rot and be destroyed. When the roots are parted, they should not be divided into too small pieces, especially if they are designed to have flowers; as until the roots have spread to the sides of the pots they rarely put out flower-stems, for which reason they should not be planted in over large pots.

They thrive best in a light rich earth, such as is met with in the kitchen-garden; with this the pots should be filled within two inches of the tops, then the roots placed in the middle of the pots, their crowns upwards, the pots being immediately filled up with some of the same rich earth: after this they should be plunged into a hot-bed of tanner's bark, and be sparingly watered, until their stalks appear above ground, when they will require a greater share of moisture, especially during the warm summer months; but in autumn the waterings must not be often, or in great quantity at a time; and during the winter season, when the roots are inactive, but very little should be given them. The pots with these roots should constantly remain plunged in the tan-bed, as when they are taken out and placed on the shelves in the stove, the roots frequently decay from the shrinking of their fibres.

In the above method of culture, both these plants have been found to multiply rapidly, and produce fine large roots.

In the West Indies, the Ginger plant is found to succeed best in such soils as are rich and cool; but in those that are of a more clayey na-

ture the roots shrink less in scalding. The lands intended for the culture of this plant are first well cleared and hoed, then slightly trenched over. In this way they are made ready for planting, which is performed in March or April. The plants flower about September, and when the stems are fully decayed the roots are taken up. This is usually in January or February.

AMORPHA, a genus comprising a hardy deciduous flowering shrub of tall growth, and of the Bastard Indigo kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

Its characters are: that the calyx is a one-leaved perianthium, tubulous, cylindrical, and turbinate: the mouth erect, five-toothed, obtuse, the two upper teeth larger than the others; permanent: the corolla composed of one ovate, concave petal, scarcely larger than the calyx, erect, inserted into the calyx, between the two larger and upper teeth, and placed at the upper side of it: the stamina have filaments very slightly united at the base, erect, unequal in length, longer than the corolla: the antheræ are simple: the pistillum has a roundish germ, subulate style, of the length of the stamina, and simple stigma: the pericarpium is a legume, lunulate, reflex, larger than the calyx, compressed, more reflex at the tip, one-celled, and tubercled: the seeds are two, oblong, kidney-shaped.

There is only one species, which is the *A. fruticosa*, Shrub *Amorpha* or Bastard Indigo.

It is a plant that rises with many irregular stems to the height of twelve or fourteen feet, with very long winged leaves, in shape like those of the Common *Acacia*. At the extremity of the same year's shoots the flowers are produced in long slender spikes, they are small and of a deep purple colour; make their appearance the beginning of July, but the seeds do not ripen in this climate. It grows naturally in Carolina, where a coarse sort of indigo was made from the young shoots, which occasioned its obtaining the name Bastard Indigo.

Culture.—This shrub is generally propagated by seeds, which are annually received from different parts of America; as it is found in many of the northern colonies. They usually arrive about February, and should be sown as soon as possible afterwards in a light soil. And it may also be propagated by laying down the young branches, which in one year make good roots, and may then be taken off, and planted either in the nursery, or the places where they are designed to remain. But if they are put into a nursery, they should not remain there more than one year: for, as the plants make large shoots, they do not remove well when they have remained

the latter end of August.—The Bourdine has a pretty large fruit, of a fine red colour towards the sun; the juice being rich and vinous. It is a good bearer, especially when old, and the fruit is highly esteemed. It becomes ripe about the middle of September. It answers well as a standard, producing plenty of good fruit. The Chevreuse, or Belle Chevreuse, is a good peach: it is of a middling size, and beautiful red colour; the juice being rich and sweet. It ripens about the beginning of September, and is a plentiful bearer.—The Red Magdalen, which is large, and full of a rich sugary juice of excellent flavour. It is a good peach, and becomes ripe in the beginning of September.—The Early Newington, or Smith's Newington, which is of a beautiful red colour towards the sun; full of a sugary juice, and becomes ripe in the beginning of September.—The Montauban, which is of a deep red colour, inclining to purple, next the sun; but pale towards the wall. It has a fine melting flesh, with a rich juice; and is a plentiful bearer. It ripens in the latter end of August.—The Malta Peach is of a fine red colour next the sun; and has a white melting flesh. It is a good bearer; and the fruit ripens in the beginning of September.—The Noblesse is a large peach, of a bright red colour towards the sun: the flesh melting, and the juice very rich in good seasons. It is a good bearer; and the fruit ripens in the beginning of September.—The Old Newington Peach, which is of a fine red colour, has a high vinous-tasted juice; and is esteemed a good Pavie. It ripens about the latter end of September.—The Chancellor, which is one of the best sort of peaches, and of a fine red colour next the sun; the skin is thin, the flesh melting, and the juice very rich. It ripens about the beginning of September.—The Bellegarde Peach, or Gallande, is very large, and of a deep purple colour where exposed to the sun: the flesh melting, and full of a very rich juice. This is a fine peach, ripening about the middle of September.—The Lisle Peach is of a middling size, and of a fine violet colour next the sun: the flesh is melting, and full of a vinous juice; but adheres to the stone. It ripens about the middle of September.—The Rosanna, which is of a fine purple colour next the sun; and has a rich vinous juice. It is reckoned a good peach; and becomes ripe about the middle of September.—The Rambouillet, which is usually termed the Rumbullion, is pretty large, and of a fine red colour next the sun: the flesh is melting, and the juice vinous and rich. It ripens about the latter end of September.—The Admirable, which is a very large and beautiful peach, finely coloured with red towards the sun: the flesh is melting,

and the juice sugary, and of an exquisite taste. It ripens about the middle of September.—The Bellis, or La Belle de Vitry, has the fruit of a pale red towards the sun; the flesh being white, and adhering to the stone; but the juice vinous and rich. It becomes ripe in the latter end of September.—The Portugal, which is of a beautiful red colour towards the sun, and generally spotted; the flesh being firm and adhering to the stone, and the juice rich and vinous. It ripens late in September.—La Teton de Venus, or Venus's Breast, which is a middle-sized fruit, somewhat longish; the side next the sun being of a pale red, the flesh melting, and the juice sugary and rich. It ripens about the latter end of September.—La Pourprée, or Late Purple, which has the fruit large and of a purple colour: the flesh melting, and the juice sugary and rich. It ripens about the beginning of October.—The Nivette, which is of a bright red next the sun, and of a yellowish cast towards the wall: the flesh is melting, and full of a rich juice. It is an excellent peach, and ripens about the middle of September.—The Monstrous Pavie of Pomponne, which is very large, and of a round form; the flesh being white and melting, but adheres to the stone. It is of a fine red colour towards the sun. This ripens in the latter end of October.—The Catharine Peach is a fine large fruit of a round form, and beautiful red colour towards the sun: the flesh is melting, and full of a rich juice; but adheres to the stone. In this the pulp is improved by its lying three or four days before it is eaten. It ripens about the latter end of October; but there are not many situations where it is perfectly ripened. It is a plentiful bearer.—The Bloody Peach, which is of a deep red next the sun; the flesh having also a deep red cast. It seldom ripens in this climate without forcing; but is reckoned excellent for baking and preserving.—The Royal, or La Royale, which is a large round peach, of a deep red next the sun: the flesh is melting, and full of a rich juice. It ripens in the latter end of September.—The Cherry Peach, or Pêche-cerise, which is small and globular; but of a beautiful red colour towards the sun, and of a whitish wax colour on the otherside. This colour, which resembles that of the Pomme d'Api, gives this little peach a beautiful appearance. The flesh is melting, and the juice has a tolerably good flavour. On a dry soil and good exposure it ripens about the beginning of October.—Grimwood's New Royal George, which is a high coloured peach, and of a fine flavour. It ripens in the latter end of August or beginning of September. It is probably the same as the Royal George.—The Superb Royal is a fine large peach, of a red colour to-

wards the sun, and pale on the other side. It ripens in September.—The Queen Charlotte, which nearly resembles the Small Mignonne; and ripens about the same time.—The Late Violet, which is esteemed a very fine peach, and ripens in September.—Lockyer's Peach is a fine handsome fruit, and ripens in September.

In addition to the above, Mr. Forsyth mentions others, as proper for cultivation, as: Allen's Royal; Bourdeaux; Buckingham Mignonne; Carlisle; Double Swalch; Double Montagne; Dwarf Orleans; Eton; Fairscot's; Ford's Seedling; Hemskirk; Incomparable; Lord Falconberg's Mignonne; Low's Large Melting; Mal-lacotan; Millet's Mignonne; Pavie Admirable; Pavie Royale; Pêche de Pau; Ronald's Early Gallande; Sion; Smooth-leaved Royal George; Steward's Late Gallande; Vanguard; Violette Hative; White Blossomed; and the Double Blossom, which is highly useful as an ornamental plant.

Notwithstanding this extensive list, a few sorts are only recommended as worth planting, in Miller's Dictionary. These are the Early Purple; the Grosse Mignonne; Belle Chevreuse; Red Magdalen; Chancellor; Bellegarde; Bourdine; Rossanna; Rambouillet, and Nivette. But with these, other authors recommend the Small Mignonne; Early Newington; Noblesse; Admirable; Royal; Monstrous Pavie; Swalch, &c.

Where there is room, and the situation is warm, one or two trees of the Catharine Peach should have places; as in very warm seasons it is an excellent fruit.

As these sorts follow each other in the times of their ripening, they will be sufficient to furnish proper supplies of this fruit during the season: but as in some seasons there are particular sorts of peaches very good, which in other seasons often prove but indifferent; when there is a sufficient extent of walls, it may be advisable to plant three or four other sorts; as the Montauban; the Lisle; the Old Newington; La Teton de Venus, &c.

Mr. Forsyth thinks the following sorts best suited to small gardens: the Early Avant; Small Mignonne; the Anne Peach; Royal George; Royal Kensington; Noblesse; Early Newington; Gallande; Early Purple; Chancellor; Nivette; the Catharine; and the Late Newington.

Against walls that have a north or east aspect, he recommends the Early Avant; Early Ann; Early Mignonne; Royal George; Red Magdalen; Royal Kensington; Noblesse; Grosse Mignonne; and Millet's Mignonne.

For the purpose of being forced in the peach-house, the following sorts are considered as the most proper by the author of the Scotch Forcing

Gardener: the Red Magdalen; White ditto; Royal George; Grimwood's ditto; Noblesse; French Mignonne; Montauban; Teton de Venus; Early Purple; Late ditto; Orange; Hative; &c. Mr. Forsyth likewise advises the use of the Catharine Peach in this way, as possessing many advantages.

In France they distinguish those called Peaches into *Pavies* and *Peaches*; those being called Peaches which quit the stone; while those whose flesh closely adheres to it are termed Pavies. The last are much more esteemed there than the Peaches, though in this country the Peaches are preferred by many persons.

The sign of a good Peach is that of its having a firm flesh, the skin fine and thin; of a deep or bright red colour next the sun, and yellowish next the wall. The flesh of a yellowish colour, and full of high-flavoured juice; the stone small, and the pulp or flesh very thick.

The third, or Nectarine, though formerly considered as a distinct species from the great difference in the fruit from that of the Peach, is at present, on account of the different sorts of fruit having been produced on the peach-tree, esteemed as a variety of it. It is not capable of being distinguished from the peach either in its mode of growth, wood, leaves, or flowers, with any great degree of certainty; but the fruit is perfectly distinct in all the different stages of its increase and maturation; the skin or rind in it being smooth and firm, while in the peach it is covered with a soft downy substance. The flesh or pulp of the former is likewise much firmer than in the latter.

It may, however, be treated of separately for the sake of distinction in its culture.

The *A. Nucipersica*, or Nectarine Tree, is commonly a smaller tree than the Peach: the trunk and larger branches are covered with a lighter bark: the smaller branches or twigs are more tender, and inclining to red: the flowers are less than those of the Peach, and of a darker red colour. These differences are, however, frequently trifling, and by no means constant. The principal distinction certainly is in the fruit, which is smaller and rounder, without any lateral cleft. It has its name *Nucipersica* from the similitude of the fruit in smoothness, colour, size, and form, to the Walnut covered with its outer green shell: and the English name of Nectarine is deservedly given it, from the rich, racy, nectareous flavour of the fruit; which in its highest perfection is superior to any other European fruit, and perhaps to many boasted fruits of hotter climates.

There are several varieties that deserve attention for the purpose of cultivation: Fairchild's Early Nectarine, which is one of the earliest, is

a small round fruit, of a beautiful red colour, and well flavoured, that ripens about the middle of August.—The Newington Nectarine is a fine fruit, of a beautiful red colour next the sun, and yellow on the other side: its flesh adheres to the stone. It has an excellent rich juice, and ripens about the middle of September.—The Elruge Nectarine is of a middle size, of a dark red or purple next the sun, and of a pale green on the other side. It has a soft melting pulp, and vinous juice; becoming ripe in the latter end of August or beginning of September. It is said to have been first cultivated by Gurlé, a Nurseryman at Hoxton, in the time of Charles the Second.—The Scarlet Nectarine has a fine scarlet colour next the sun, but is of a pale red next the wall. It ripens in the latter end of August, or beginning of September.—Brugnon, or Italian Nectarine, which is of a deep red next the sun, and a pale yellow on the other side; the flesh adhering to the stone. This has a rich flavour in good seasons, and ripens in the latter end of August, or beginning of September.—The Román Red Nectarine is a large fruit, of a dark red colour next the sun, but of a yellow colour on the other side: the flesh adhering to the stone. When fully ripe it shrivels, the pulp being then replete with a rich juice. It becomes ripe in September. It is observed by Mr. Forsyth, that this Nectarine has a smooth leaf, and the Newington a jagged one; which is one of the most essential differences by which these two excellent fruits are distinguishable from each other.—The Murry Nectarine, which is of a reddish colour towards the sun, and of a pale green towards the wall. Its fruit has a tolerably good flavour, and ripens about the middle of September.—Temple's Nectarine is of a middle size, of a pale red colour towards the sun, and of a yellowish cast next the wall. Its fruit, when quite ripe, shrivels; the pulp being then full of rich juice of a fine flavour. It ripens about the middle of September or beginning of October.—The Golden Nectarine, which is a handsome fruit of a soft red colour towards the sun, and yellow on the other side: the flesh adhering to the stone. It has a rich flavour, and is ripe about the beginning of October. The Peterborough, or Late Green Nectarine, sometimes denominated the Vermash, is of a middle size and round shape, being always of a green colour: the flesh is firm, and in a good season tolerably well flavoured. It ripens about the middle of October.—The Violet Nectarine is of a middle size, and a purple colour next the sun, but pale on the other side: it has a vinous flavour, and ripens in the latter end of August or beginning of September.

In addition to this list, Mr. Forsyth has recommended Anderson's Nectarine; Aromatic; Black

Newington; Clermont; De la Taille; Early Pavie; Genoa; Luncomb's Black; Musk Violet; Newfoundland; New White; Princess Royal; Rogers's Seedling; Royal Chair d'or; St. Omer's; Tawny, ripe in September; White, ripe in August and September.

The best of these varieties, according to Miller, are: the Fairchild's; the Elruge; the Newington; the Roman Red; and the Temple; but especially the Newington and Roman. The White Nectarine is likewise a good fruit, and a curious variety.

And as a proper selection for a small garden, Mr. Forsyth recommends the Fairchild's Early Nectarine; the Elruge; the Scarlet; the Newington; the Red Roman; and the Murry.

For the purpose of forcing, Mr. Nicol advises the Roman; the Scarlet; Elruge; Newington; Temple; and the Duc de Tillo; the last is a Spanish Nectarine, and, of all others, ought, he thinks, to take preference. The fruit is of the most exquisite flavour, dark purple, a free-stone; and grows to the size of a Noblesse Peach in the same house with it; and the tree is the most healthy and beautiful, and bears large and regular crops.

Culture in the Almond kind. The propagation of these trees is either effected by budding them upon plum, almond, or peach stocks, or by setting the stones of the fruit. But as by the first method they sooner form full and regular heads, and also more early attain to the state of flowering and producing fruit, it is that mostly practised; and if it be intended to continue any particular sort, it is only by this mode that it can be effected with certainty, as, where the trees are propagated from the seed, they are apt to vary, all the varieties proceeding frequently from the fruit of the same tree.

The operation is mostly performed about the latter end of the summer, as in August, and may be done either for dwarfs, half, or full standards. It is remarked by Mr. Forsyth, that in the spring, after being budded, they may be trained for standards, or suffered to grow for half standards; but the method generally practised, is to bud them at such heights as the stem is designed to be, and the second year afterwards to plant them out for good. If these trees are to be afterwards transplanted into a dry soil, it is recommended to be done in the month of October, when the leaves begin to decay; but if into wet ground, the month of February is to be preferred. In wet soils, such as are budded on plum stocks are found to thrive best, but those on almond or peach stocks succeed with the greatest certainty in dry ones.

In raising trees of this kind from the stones, the early autumn or spring months, as October

and November, or February and March, are the best seasons for planting them in, care being taken to select stones of the last summer's growth; they are best drilled into beds of good light soil, to two or three inches in depth. In the spring the plants will appear; and in the autumn or spring following they may be transplanted into the nursery, and be arranged in rows, according to the wish of the planter, for the purpose of being afterwards trained for standards, half standards, or dwarfs.

When it is intended to bud any of them with peaches or almonds, some of them will be in a proper state for the operation for dwarfs the first, and all of them the second year after being transplanted; but in order to be trained with proper stems for standards, they should invariably have three years' growth.

It is likewise easy to raise the dwarf sorts by suckers from the roots, and by layers, as well as by being propagated by budding upon the plum or almond-stocks. The best season for these operations is the latter end of summer or beginning of autumn.

Pruning.—The method most common for pruning trees of this sort is, to shorten the first shoot from the bud to a few eyes in the spring, in order that lateral shoots may be put forth by the trees in proper quantity, so as to form regular full heads. Mr. Forsyth advises, when young trees are brought from the nursery, never to cut them till the young shoots begin to break, as about April or May, strong trees being cut about a foot from the ground, and the weaker ones half the distance; but when the wood is not well ripened, as after wet autumns, hard winters are apt to kill the shoots: in such cases they should be cut down to the sound wood, taking care to prune out all such cross shoots as rub against others, the tree being left open in the middle, and the shoots cut about the same length as for apricots, and in proportion to their strength, always wholly cutting out and removing the decayed wood and cankerous parts of the trees.

It is also recommended by the same practical author, that they be planted in sheltered situations, and such as have a southern aspect, whether used as standards or half standards. It may be necessary, in some cases, to protect them by a light covering of some kind, against the injury to be expected from the frosts in February and March; with dwarf trees this may be done by fixing up poles and thatching over them with fern, straw, or other similar substances, which may be removed when the frost is gone, and the weather fine and settled in the spring; by which a good supply of almonds may sometimes be procured. Sometimes trees of this sort are planted in espaliers, and against walls, in order to improve and render the fruit more early.

To preserve the fruit of the almond-tree it is necessary that it should be first properly dried, and then put into either bran or sand.

The larger sorts of these trees, from the beauty of their early blossom, may be employed with great effect in the back parts of the borders, or clumps of shrubberies and pleasure grounds, when properly intermixed with other kinds of flowering shrubby trees of tall growth. They are also highly ornamental when placed singly on lawns, or other open spaces near the house.

The great beauty of the dwarf sorts, when in blow, will be best displayed, and have the fullest effect, when they are arranged and blended with other low shrubs in the fronts of such borders and clumps.

Culture in the Peach kind.—In the propagation of peach-trees, it is necessary either to bud them upon plum stocks, or to set the seed: by the latter method most of the fine varieties of this fruit have probably been at first obtained; yet it is extremely uncertain of success, from their great tendency to deviate from the nature of the variety of the original seed. In the raising of new varieties in this method, it is best to set the seeds in drills two or three inches deep, in good mould, in the autumnal months, as about October or November; but when neglected at that season, they may be preserved in sand till February, and be then put in. In the ensuing spring the plants will be up; and after the growth of one or two years, according to the intention of the planter, they will be fit for being transplanted into the nursery; in doing which they should be placed in rows, at the distance of a foot or a foot and a half; the proper seasons for performing the work being in the early autumn or spring months. From this situation, after remaining twelve months, some of them may be taken for the purpose of training, and being planted against walls, pailing, or other fences adapted to the purpose.

But in order to propagate a variety with the greatest degree of certainty and success, it is best to pursue the method of budding, as by this means the trees become much sooner in a state of bearing, and, at the same time, produce a fruit, which in size, colour, and taste, has an exact resemblance to that of the tree from which the bud was cut. It is sometimes the case, that peaches are budded on stocks of different sorts, as the apricot, the almond, the plum; but the last, as being more hardy and suitable to afford a full bearing condition, should always be preferred: it has also another advantage, that of thriving in almost any kind of soil. When it can be procured, the muscle plum stock is by much the best, as being most prosperous and durable.

By sowing the seeds or stones in the manner

that has been already seen, stocks for this purpose may be raised from different varieties of plums, as well as peaches, almonds and apricots: however, the true muscle plum cannot with such certainty be produced in this way, as when raised by seed, being liable to great variety. The only method that promises success is by layers or suckers, from peach or other trees that have been worked upon that sort of plum stock, which may be collected in autumn, or the early spring months, selecting such as are of the size of the little finger, which, after the side branches and knots of old wood that adhere to the roots have been trimmed off, should be planted about two feet and a half distant, in rows. Of these some will be ready to bud for dwarfs the following summer. The stocks most proper for budding upon, in order to form dwarfs, are those of from half an inch to an inch in thickness, and those of stems an inch thick at the bottom, and four or five feet high, for half or full standards.

The season most proper for budding is August; as when this operation is performed in the earlier months the buds are liable to put out weak shoots the same season, and the winter to injure them so greatly as almost to prevent their progress.

As trees of this kind are mostly trained against some sort of fence, to bud them so as to form dwarfs should be a principal motive: the stocks should therefore be budded within five or six inches of the bottom, so that the branches may come out low, and by degrees be trained to occupy every part of the wall: however, where the fences are high, they may be budded for half or full standards, and trained accordingly: care should be taken, in the performance of this business, that only one bud be inserted into each stock, the head of which should remain perfect until the spring: about March the whole of the heads should be cut over in a sloping direction, just above the insertion of the buds; presently after which the buds will shoot out, each producing a strong erect shoot, which will have attained a considerable height by the autumn, and the trees by that time have acquired their first state of formation, which, in the autumn or early spring months, as October and November, or February and March, should be transplanted against walls proper for the purpose, and where they are finally to remain; or occasionally against a reed fence or paling, for training, one, two or three years, to give them the requisite formation as wall trees, previously to their being placed into their allotted situations: whichever method may be practised, it will be necessary to have the first shoot headed down to a few eyes, in order to produce a sufficient supply of lateral shoots below. The trees, in this way, may be expected to fruit in two or three years.

Trees of this sort succeed best in soils that are tolerably dry, but not too open or porous. Mr. Forsyth thinks that a light mellow loam is the most proper soil for peaches, as they require it to be lighter than either the pear or the plum. In places where the natural soil inclines to clay, or a strong brick earth, in order to prepare the borders for the trees, it may be necessary to take some part of the soil away, and to mix it with light mould, sand, or old lime-rubbish; and in making up the borders, a further quantity of earth should be taken out, at the places where trees are to be planted, to the depth of three feet, and the breadth of four, and mixed well with street-dung, or rotten leaves, and the above substances, throwing up the whole together into rough high ridges, in order to its being fully exposed to the action of the frost, and the mellowing influence of the winter season.

In no case where it is intended to plant these trees against walls should the borders be narrower than three or four feet, and when made six or seven feet they are better.

In places where the soil is of a moist wet kind, it would be advisable, in the opinion of the same writer, to lay deep drains across the borders, to communicate with others along the walks, in order to draw the water from the roots of the plants: in the bottoms of these cross drains may be put, old bricks or stones, with gravel above, taking care to have at least two feet of good mould to the surface; and if the ground has a stiffness and tendency to retain water after rains, the borders should be laid with a suitable slope, to carry it off as much as possible, and prevent its stagnating about the roots of the trees. In sour moist clay soils, brick-bats or cores from the screening of lime may be thrown into the bottoms of the borders, and rammed so as to form a solid surface, and then covered with dry lime-rubbish, which may prevent the roots of the trees from entering the wet earth or clay, and also materially contribute to take off the water.

And in cases where there is not sufficient descent to take off the water in an expeditious manner, hollow covered drains may be formed in the bottoms of the walks, about the middle, the sides being filled up with brick-bats and small stones in finishing, the walks being well rounded to throw the water to the sides.

The vegetable disease termed mildew is, it is added, the certain consequence of water being suffered to stagnate near the roots of tender trees in strong soils, and they are thereby almost entirely spoiled. In some instances it may, perhaps, be possible, by moving them to a drier soil and different aspect, to recover them. It is to be remarked that all the French peaches, on

strong adhesive lands, are particularly subject to be affected in this way.

The aspects most advantageous for trees of this description are such as have the greatest command of the south sun; but an eastern or western exposure has sometimes been found to answer tolerably well.

But whatever the nature of the aspect may be, it is always necessary that they be trained against a wall, as they never succeed so well when placed against wooden fences; and, if the walls have a projecting coping, are found to be better protected from frosts in the early spring months.

Choice of Trees.—It is thought by Mr. Forsyth, that in selecting this sort of tree such plants as have the strongest and cleanest stems should always be preferred, and that those that have been headed down, and are of two or three years' growth, will fill the walls, and fruit much sooner than where the contrary is the case. Plants with one stem are supposed by much the best, as in training they leave no interval of the wall uncovered. That it is the common practice to prefer trees with the smallest stems he is well aware, but thinks the shoots they afford are always weaker than in others.

The gardener should always be early in procuring trees of this sort from the nurseries, as otherwise he will only have those that have been repeatedly picked through to select from.

Maiden or un-cut-down trees, of one or two years' growth from the bud, are in general to be preferred; but where they are wanted to cover the walls, and bear as soon as possible, trained trees must be provided. The former are advantageous in establishing and fixing themselves in the soils much better than the latter, besides being procured at much less expense, and admitting of being trained in a better manner.

Planting.—The autumn or the spring are the only proper seasons of planting trees of this kind. Perhaps the best season for performing this business, in warm dry soils, is October or November, as soon as the leaves begin to fall; but the spring months, as February and March, are probably to be preferred in very moist or wet soils.

If the borders be new, whatever season may be appropriated to the performance of this work, the ground should, according to Mr. Forsyth, be well trenched over before planting the trees; and where they are to supply the places of such trees as have died, or have been removed, great care should be taken to clear away the old roots, and to put fresh mould into the places from whence the old trees were removed, laying the new earth sufficiently above the old, but by no means to

plant the trees too deep, as by this means they are frequently injured; as where the trees are not kept above the level of the old ground at first, they seldom thrive well. After planting, the roots should be well watered, and suffered to remain till the whole of the water has been taken up, the earth then well trodden round them, and filled to an even surface: when planted in the autumn, the trees should remain without being pruned until the spring.

It is mostly recommended that trees of this sort, as well as those of others designed for walls, when of one year's growth from the bud, with heads entire, should at once be planted into their permanent situations; by which, as a chief point to the well forming them, they may for the two first years be more perfectly pruned and trained.

From about twelve to fifteen feet from each other is in general the proper distance of planting peach trees. If the walls are high, half or full standards may sometimes be planted between the dwarfs, to fill the upper parts until the dwarfs grow of sufficient height to cover them. But when the walls do not exceed eight feet in height, only dwarf trees should be planted, at the distance mentioned above: if of nine feet in height, half standards of three or four feet stem may be introduced in the intermediate spaces; when of ten or twelve feet, recourse may be had to full standards, with stems of five or six feet to cover the upper parts, removing annually the lower branches of the standards as the dwarf trees approach them, and at length taking them wholly away, when all the space will be occupied by the dwarf trees.

Great care should always be observed, in removing trees of this sort from the nursery, that the roots be kept as entire as possible, cutting away any part that may happen to be bruised, as well as shortening the long small roots.

In planting them, a space of four or five inches from the wall is the proper distance, the buds being placed outwards, the head a little inclining to the wall, which, to prevent any injury from the winds, may be tacked to the wall immediately; watering moderately once or twice a week, if the ensuing spring should prove dry and hot.

Pruning.—Trees which have been planted with the heads from the bud entire, should be headed down in March or April, when they just begin to shoot, by shortening the main shoot within a few eyes of the bud, in a sloping direction towards the wall. This is proper to be done in order to form them into good trees, as, by preventing the upward direction, it causes lateral shoots to be sent out near the parts they are budded from. In attending to the shoots that are

made from the few eyes that were left, such should be rubbed off as come out either in front or back of the branches, retaining the lateral ones only, which, as they arrive at sufficient length, as about June, should be nailed to the fence, and remain during the summer without being shortened.

When the leaves have fallen, about November, or in the following March, the first winter-pruning may be performed, which should be done according to the number of shoots produced from the heading down: if there be two shoots, one on each side, they may both be retained, being cut to eight, ten, or more inches, in proportion to their strength, to promote a further supply of wood, nailing them to the fence in a horizontal direction. If there are three shoots, and the middle one regularly placed, it should be put in an upright direction; if four, two should be trained on each side, equal number, strength, and regularity at this period, being chiefly to be attended to.

In the second year's summer pruning, the shoots should but in few instances be shortened; and all such as proceed from the horizontal branches of the former year preserved and trained, except the *fore-right* shoots, which should be rubbed off as useless.

The pruning the second winter should be done about the same period as the first; the weak shoots should be removed, and the branches preserved in as much regularity and uniformity as possible as to number and size, shortening them as above directed.

Mr. Forsyth advises, in the first year, when the leading shoot is very strong, to pinch off the top of it about the beginning of June, which will make it throw out some fine strong shoots, to help to fill the walls. None of the shoots should, he thinks, be suffered to grow too long during the first and second years; which may always be prevented by pinching the ends of them; but they should never be topped when the tree sends out fine kind shoots, till the spring following, when they may be pruned according to the strength of the tree, and the quantity of wood it has made during the preceding summer, leaving the shoots from six to twelve inches long; by which means the lower parts of the walls will soon be able to be filled. It is, he observes, too common a practice to lay in the shoots at full length, taking off only the points of the branches, which generally, after a few years, leaves the walls quite naked: whereas, if attention were paid to the training, especially for the first four years, the walls might always be filled with fine bearing wood from top to bottom, and the trees produce a great deal more fruit, and of a much finer quality than when they are

run up in the former way; for those trees, in general, are so weak that they have not strength to bear good fruit. The third year, if care be taken to manage the trees properly in summer, they may be brought into a bearing state. If the ground be strong, they will grow very vigorously; in which case, pinch all the strong shoots about the month of June, which will make them throw out side-shoots; these, if not laid in too thick, will make fine bearing wood for the succeeding year. If the strong shoots be suffered to grow to their full length, they will be large and spongy, and will neither produce fruit nor good wood for the following year. Weak shoots should, he thinks, never be nailed, although they may be full of blossom, as they never bear good fruit. Sometimes weakly trees are covered over with blossom; but if too much fruit be suffered to remain on them, they will be weakened so much that they will never recover. In that case he would recommend picking off the greater part of the fruit, to let the tree recover its strength. When trees are pruned in the above state, he cautions gardeners never to prune at a single flower-bud; as if that be the case it is sure to kill the shoot; or, it will at least die, or be destroyed as far as the wood-bud which is nearest to it.

In pruning, where attention is bestowed, some shoots, and sometimes whole trees, are, he says, found with nothing but single flower-buds. These sorts of shoots should be laid in at full length, and always attend to the next branch that has got some wood-buds, and cut it close, that it may produce fine wood to supply the place of those that have only flower-buds, which may be cut out the year following.

At the period when peach-trees come into a bearing state, there will, in general, be seen two flower-buds close together, and in looking between these flower-buds, what is termed a wood-bud may be seen; the cutting should constantly be performed at these double buds, as the shoots which bear fruit the following year come out from between them.

The proper form for bearing being thus attained, the trees may be preserved and kept in order by requisite summer and winter pruning.

Mr. Forsyth, however, observes, that when the trees come into a bearing state, they may be kept in a flourishing condition by proper management and attention to the summer pruning. It has often been his practice to top the strong shoots twice in the course of the summer, before he could get them to produce fine kind bearing wood, having often had shoots that grew, in the course of one summer, upwards of six feet in length, and as thick as his thumb. If such shoots as these be laid in near their full length,

the lower part of the wall will, he thinks, be left naked; besides, these strong shoots exhaust the tree of its strength, and never produce good wood, if neglected to be topped in the summer. He recommends the cutting out all such shoots when the trees are pruned in the spring, and to leave only the fine kind bearing wood, which is easily known by its having two small leaves where the flower-buds are to be the following year, while the strong shoots have one leaf-bud only at each eye, constantly taking care to lay the branches as horizontally as possible, which will check the growth of the shoots, and, at the same time, make the wood much finer, and more fit for bearing the succeeding year. All the useless side-shoots that cannot be nailed in against the wall should invariably be rubbed off, leaving only the best, which must be laid in about three inches apart.

Much attention is likewise recommended to the picking off all the side-shoots that come out near the tops of the branches; as, when left, they weaken the fruit-bearing branches for the ensuing year. This is best performed as soon as they can be laid hold of by the finger and thumb, for when suffered to grow strong they hurt the fruit-bearing shoots very much.

In the old trees, where they run up to the top of the walls, leaving three-fourths of them nearly naked, the best way, according to the same writer, is to cut them as far back as any young shoots or buds can be found. Some young shoots or buds must always be left on peach-trees, otherwise the life of them will be endangered. They should never be headed down in the manner of the apricot, apple, or pear-tree. If peach-trees are headed down, without attending to these cautions, a great risk is run of killing them; but where there are a few young shoots the top may with safety be cut off just above them, as they will lead the sap up, and produce strong branches, which should be topped in the same way as young trees that are intended to fill the walls.

Mr. Forsyth further observes, that it is always more difficult to procure new wood from old peach-trees than from any others, except nectarines. He has often made incisions in the old branches, about the joint, cutting out a piece from one to three inches, according to their sizes. This he advises to be done in several places of the tree, to furnish it with young wood; always rounding the edges where the incision is made, which should be above the joint, but as near to it as possible. The operation should be performed in the month of April; but not unless some young shoots are perceived to make their appearance; which, when they are about three or four inches long, cut off the old branch, by

which means the fresh young wood will make a rapid progress the first summer, and in the following year fine fruit will be produced on them.

The use of his *composition* is constantly advised where old branches are cut off, and care should be taken to round the edges.

It becomes necessary, according to the same horticulturist, about the latter end of April, to look over the trees again, and rub off what superfluous *fore-right* shoots have remained from going over them the first time. If the trees were examined once every fortnight it would, he thinks, be the better, as by such means they would be kept in more perfect order. He has so accustomed himself to look over trees, that he does it as he walks about his ordinary business, which saves much time.

The principal object, or that of bearing fruit, is, according to some, best effected by shortening each year's branches in the winter prunings, as by this means they are made to afford both a supply of bearing wood and a crop of fruit, the year old shoots most generally affording the greatest supply.

The general summer prunings are, by some, chiefly directed to the reforming of irregularities in the numerous shoots produced; but the winter prunings, to the reforming of the branches of all ages, sizes and situations, and to the rendering the trees healthy, beautiful, and productive.

Nailing.—As the pruning advances the nailing should be performed, in which operation great regularity should be observed in laying the branches in a horizontal direction, having the extremities very little raised above the part from whence it takes its direction, the degrees of obliquity being as little as the nature of the situation will allow. The shoots should likewise be placed at such suitable distances from each other, as that, when the leaves are fully expanded, they may have sufficient room to stand without shading the branches in too great a degree. These last should never be nailed in an upright, where it is possible to give them any other direction, as, in such cases, they are liable to send off shoots from the highest eyes, and leave the inferior parts of the shoots quite naked. If too much wood has been left, it must either be cut out altogether, or to an eye, for the purpose of a shoot the succeeding year.

Mr. Forsyth advises that care should be taken not to let the shoots get too long before they are tacked to the wall, lest they should be broken by the wind. He does not, however, approve of nailing the young wood too soon; for, by so doing, the heat of the sun is apt to occasion them to grow too fast.

By saving some of the largest and straightest

shoots that are cut off, and running them in among the small branches of the trees to prevent them from being broken by the wind, the middle of the branch run in, being on the outside of the shoot that is wished to be preserved, and the ends tucked under the two adjoining branches, a great deal of the second summer nailing may be saved. Immediately after the fall of the leaf it will be necessary to take out these loose branches; by which the shoots may have more liberty, and the sun and air be more fully admitted to ripen the wood before the spring pruning commences.

At the time this nailing is performed, carefully take off all the side shoots that come out from the tops of the young shoots. In performing the second nailing, if any very strong shoots are found, they should be cut out; leaving the fine kind side shoots that have been produced since the first topping, but only such as will bear fruit.

When the autumn proves fine, the trees mostly continue in full leaf to the end of October, and sometimes to the end of November. At the time the leaves begin to fall, a soft broom should be employed, brushing it gently over the branches of the trees, in order to take off as many of the leaves as possible, without hurting the buds. The brushing should however be performed upwards, for in the contrary direction it will be liable to break and destroy the buds.

When all the leaves are removed, Mr. Forsyth advises the unnauling of the young branches that were nailed in during the summer, leaving the strong ones to keep the tree fast to the wall, as, by these means, from the branches being loose from the wall, they will receive the benefit of the sun and air more fully, to ripen and harden the young wood, which, in that case, will not be so liable to be killed by the severity of the winter season; and, by leaving the trees so till the spring, when the pruning is to be performed, there will be a great choice of fine bearing wood to cover the walls with.

He also advises the nails and shreds laid up in autumn, when the branches were unnailed, to be pointed and picked during the wet weather in winter, in order to be fit for use again; and that such shreds as have been used in summer be soaked in boiling-hot soapsuds for three or four days, in order to destroy the eggs of earwigs and other insects, which are highly destructive to this sort of trees.

These trees, from their coming early into blossom, should be protected from the frosts to secure the fruit: various means have been attempted for this purpose; the most effectual are, by nailing light mats or strong open canvass over them, which should be removed in the middle of the day, but kept close in the night and when the

weather is severe. Mr. Forsyth finds old netting the best covering, which should be put on threefold, as for apricots. When the leaves begin to cover the fruit, and the weather appears to be fine and settled, the netting may be taken off by degrees, but by no means all at once. By means of forked sticks, the nets may be kept at any distance required; but he advises, never to be in too great haste to uncover the trees, or suffer the shoots to grow through the meshes of the nets; as when that is the case, many of them will be broken in taking them off. He thinks it best to uncover the trees in cloudy weather, or when it is likely to rain; as when the nets are taken off in clear weather the leaves are liable to be injured by the sun. In taking off the *fore-right* and side shoots care is necessary not to expose the fruit; the best method is to rub them off near the extremities, leaving those which are wanted to fill up the wall as low on the branch as possible, and only one as a leading shoot.

When the fruit of these trees sets too thick, thinning becomes necessary, according to the vigour and size of the tree. The largest and best placed should be left; if the leaves cover too much they should also be pinched off.

Mr. Forsyth advises this to be done when the fruit is about the size of a small marble, which must be left much to the judgment of the person who performs it; but it should be according to the strength of the tree, and be done very regularly, that the fruit may be equally dispersed over the tree. When left too thick, it will not have room to swell, as frequently happens; but, if the tree be very strong, from three to six peaches may be left on each shoot, according to the strength and length of the branch or shoot.

It is remarked, by the ingenious author just noticed, that "he has observed, that where the *composition* he recommends was applied to prevent the sap from being exhaled by the sun and air, all the trees that were very much loaded with fruit were not in the least hurt, while the trees that were treated in the common way were greatly injured, and often killed when they had a great crop."

It is of great advantage, in the opinion of this writer, in very dry seasons, to make a large bason round each tree; or, what is better, make up an edge along the whole border with mould, as for a bed to bed out plants in a nursery, and then give the trees a good watering, and mulch the border with some perfectly rotten dung or leaves, which will keep the roots of the trees moist, and prevent the ground from cracking. The trees should be watered once a week during dry weather, and the branches and leaves sprinkled every other day in the afternoon, with an engine, pressing the

forefinger over the mouth of the pipe, to spread the water very fine. In this way the trees may be kept clean and free from insects. The sprinkling should not, however, be performed when the sun is on them, nor too late in the evening, as in the former case the leaves are liable to be scorched, and in the latter the mildew is apt to be brought on the tender sorts of peach-trees. When any of the trees are infected, leave off sprinkling them, or let clear lime-water be applied, but this should only be done in warm weather. Frequent sprinkling the trees with lime-water, and throwing it plentifully on the underside of the leaves, has been found in a short time to extirpate the acarus, or red spider, which is so destructive to peach-trees.

It is likewise advised to keep the fruit well shaded, and never to suffer the leaves to be picked off till the fruit be grown to its full size, when some of them may be taken off, to let the fruit attain its natural colour, as once a week, in a gradual manner; by which means, the fruit will continue much longer in succession than if they were picked off all at once.

It is considered as a bad practice to pick off the leaves of these trees before the fruit is grown to its natural size, as the shade of the leaves assists the fruit very much; and, wherever the leaves are picked off, the fruit is small, stunted, and ill-flavoured. It is found of utility against earwigs and other insects, to hang up short pieces of bean-stalks tied together before the trees, previous to the fruit's beginning to ripen; as by that means they may be collected and destroyed.

Any canker that may be in the old bark where the branch was amputated, is likewise recommended to be carefully removed.

The vegetable disease termed the canker is very liable to attack peach-trees, in which it is of a brown colour; and, in the bark, it appears in small specks or dots, as if made with a pen. All these are recommended to be cut out clean; for if any part of the canker remain it will affect the new wood as it begins to grow. Wherever gum is seen oozing, it may be concluded that the canker is not completely eradicated from the tree.—*See Canker.*

The blight is a disease with which peach-trees are liable to be affected, and by which the leaves are shriveled or curled up and much thickened. It arises from the imperfect nourishment and growth of the trees, from insects, and other causes, and is to be remedied by altering the state of the trees, removing the diseased leaves, washing with water in the heat of the day, or fumigating with tobacco smoke, &c.—*See Blight.*

Though trees of this kind begin to bear fruit the second or third year, they may be considered

in a state of training to their sixth or seventh, and will continue from thirty or forty to fifty or sixty years, especially when raised on plum-stocks in good bearing, where proper care and attention is bestowed in their management. And it is asserted by some, that the fruit of such old trees is much finer flavoured than such as is produced on young trees. Garden plants of the smaller kinds, that are taken off early in the spring, may be occasionally grown on the borders about them; and in the culture of the peach tree a little dung should occasionally be inserted in digging over the borders.

Forcing of Peaches.—Besides the method of raising these trees against walls in the open air, they are frequently cultivated in forcing-frames, hot-walls, and houses constructed for the purpose, in order to have the fruit more early. The first of these modes is not, however, to be much recommended. Mr. Nicol, in his *Forcing Gardener*, strongly objects to oiled paper frames, and frames placed against flued walls without front flues; to the first, on account of its darkness, and incapability of admitting the rays of light and free air, both of which are so indispensably necessary to the health and vigour of the trees; and to the second, because the front is the most valuable flue in any house, equally on account of the saving of fuel, from the circumstance of its having a greater command of temperature, and the injury done the trees by the violent heat of the back flues in keeping up the proper temperature in stormy weather; besides the propensity of insects to harbour and breed between the trellis and flue in such cases.

Suitable houses, contrived for the purpose, are constantly to be preferred: such as are wrought by one fire, communicating first with the front flue, and then having two returns in the back wall, are, in the opinion of the same writer, best adapted to early forcing, as the strength of the heat is expended in the front, so that by the time it returns to the back flues it becomes of a slow, mild nature; from which no danger can be entertained, even at the most early season of forcing. Plans for houses of this sort may be seen in the annexed plate. They may be so contrived as to serve the purpose of grapes as well as for peaches; and have one or two fires, according to circumstances.

In the latter kind a trellis may be fixed against the roof, beams or rafters, to the extent of half their height; trees being planted between the front flue and wall, and trained thereto, as these will not shade those on the back, and of course one house be rendered nearly as good as two, as the trees on the front will have an extent of eleven or twelve feet to extend themselves in.

The most advantageous situation and aspect for houses of this sort, are such as are rather elevated and face the meridian sun. For the borders Mr. Nicol advises three-fourths strong brown loam, an eighth light sandy loam, and an eighth stable dung, with about a fortieth part of shell marle, as the composition. The borders should be full three feet deep; and the breadths, for the narrow houses, about fourteen feet from the back wall; and for the wide ones all the width of the house within, and to the extent of twelve feet on the outside. They should be kept well trenched and perfectly fine on the surface, and have, occasionally, well rotted dung dug into them.

For this purpose, as well as that of planting against open walls, maiden or one-year trained trees are to be preferred: some likewise plant what are termed *riders*, of the same age, between the dwarf-trees; but the practice is not, by any means, to be recommended, as the nourishment of the others may be thereby greatly impaired. The proper distance is from twelve to fifteen feet, according as the house will best divide, for the dwarf-trees; and the best season of planting is any time from about the first of November to the beginning of the following month; in the performing of which the holes should be covered in with a light earthy compost, shaking it well in between the roots, and settling it well with a little water about them.

The sorts that are the best suited to this use have been already described.

The methods of training in these are much the same as in the preceding cases: by that of the fan-kind, they probably succeed the best. Immediately after planting, in order to make the trees put forth vigorously and fill the trellis completely from the bottom in the dwarf-trees, head them down to two or three eyes on each shoot if maiden, and to the last eye on each branch if one-year trained trees. Others however think it better to defer the operation till the early spring, when the trees are planted in the autumn. In respect to the intermediate trees, they are only set for the purpose of obtaining a crop or two while the principal ones are filling the spaces: it is not necessary to shorten them so much, whether they be maiden or trained trees, as by this means they put forth more moderate shoots, and come sooner into a bearing state, which is the chief object: they should be moved as the other trees fill up the trellis.

As soon as the shoots have attained the length of two or three inches, such as are placed *fore-right* or *back-right* should be rubbed off, and the others laid in, as they advance in growth, at the distance of nine or ten inches, care being taken not to include the leaves with the tie, and to

allow sufficient room for the swelling of the shoot, pinching off all the laterals as they appear. And when their growth is stopped for the season, cut them back from half to a third of their lengths, in proportion to their strength; and, in dressing, keep the side ones well down, in order to fill the bottom part of the trellis well. The same plan must be followed in the second season, laying the undermost shoot on each branch to furnish the under part of the tree, and the uppermost as a leader; carefully rubbing off all the intermediate ones, when not wanted, and at any rate the *fore-right* ones, leaving them generally at three-fourths of their whole length. Where the wood has been well ripened this season, they may bear a few fruit in the following. However, unless the trees are very vigorous only a very few should be suffered to remain; as it is better to furnish the trellis well for a future crop, by laying in the summer shoots regularly at the distance of six inches; and in the winter-pruning shorten the shoots of the extremities of the tree only a few inches each, laying in those of the middle at full length. This practice may be continued till the trees have wholly filled their places; afterwards shortening none, except to fill casual vacancies, or where the extremities of the shoots have been injured by bruises or other causes.

Afterwards these trees require to be frequently looked over in summer, and divested of lateral and other improper shoots, being kept regularly thin, and dressed to the trellis, &c. in a neat manner; and in tying care must be taken not to tie too near the point of the shoot; a few joints being constantly between the last tie and extremity of the branch.

When the fruit is fully set, select such buds as are thought necessary to be left, and rub off the rest in a careful manner; the uppermost and undermost ones, and sometimes one or two about the middle of the shoot, are mostly left the last in an alternate manner.

At the time the fruit begins its last swelling, it should be exposed to the sun and air as much as possible, properly thinning the leaves.

In this method it is not necessary to apply artificial heat before the third season; and then only to ripen the wood, in the autumn, when that becomes necessary for the better bearing in the succeeding year. But even in this the trees will only bear very gentle forcing.

In the fifth season the forcing may begin about February, when, according to the author of the Scotch Forcing Gardener, the fire should be made so moderate the first fortnight, as that the thermometer may not stand, at eight at night and seven in the morning, higher than 45°; raising

it in the course of the second fortnight to 50°, and afterwards gradually to 55°; at which point it should be kept till the stoning is over, and then increased to 60°; and in the time of the fruit's ripening to 65°, which it should never pass, as it would draw the young shoots up in a weak growth. In conducting the business, the greatest regularity and steadiness should be preserved; as the trees are impatient of sudden checks of all kinds, especially in the time of setting and stoning the fruit.

A free circulation of air is constantly necessary, Mr. Nicol thinks, from the time the trees are planted, in the day-time, from sun-rise to sun-set the first season, and afterwards occasionally in the second, the house being shut up at night from the beginning of March, and the same in the rest. At the time the forcing begins, it should be shut up at night from the middle of January, and have a full and free circulation through the day till the beginning of February; after which it may be admitted in a more moderate degree, according to the weather, respect being paid to its temperature till the bloom begins to open. After this, less or more must be admitted every day, if possible; as the setting of the fruit in a kindly manner depends much on fresh air being applied, and a free circulation of air kept up. In sunshine it may be admitted at this time to the extent that the thermometer may not stand at more than five or six degrees above the fire-heat medium; and at no time, till the stoning is over, above ten degrees; but afterwards, in the middle of the day, it may be suffered to rise to the height of fifteen. When the fruit begins to colour, the house should be opened by sun-rise, and not shut till sun-set, unless to defend the fruit from heavy rains; no respect being paid to sun-shine, air being equally essential to the flavour of the fruit as the rays of the sun.

This sort of fruit, when in a growing state, requires plentiful waterings; and the border should always be kept in a moist state: only restraining a little in the time of setting and stoning, and totally when the fruit begins to colour.

It may be necessary to wash the house thrice a week from the commencement of the forcing till the flowers begin to open, then withholding till the petals begin to decay, when wash again till the fruit begins to ripen; and then finally withhold, unless the trees are afflicted with the red spider, &c. in which case, wash every day till they are quite cleaned from the insects. And, in the intervals of the washings, steaming night and morning may be practised, as at the blossoming season Mr. Nicol thinks it "of infinite benefit to the trees, as it encourages the setting of the fruit, and prevents the breeding of insects; and

the engine cannot be employed, for fear of hurting the bloom."

It is necessary to thin the fruit in many kinds of peaches, to prevent the trees bearing themselves to death. The operation should, however, be performed with caution, and never be done perfectly till after the stoning is past; as till then all danger of the fruit dropping is not over. Mr. Nicol's rule for final thinning is, "a fruit for every foot square of the surface of the tree for the large kinds, and for every nine or ten inches of the small kinds of peaches, for trees in a healthy and vigorous state."

Mr. Nicol observes that it is customary to let the fruit drop of its own accord when ripe; and for this purpose the border is covered with moss, and nets or mats are hung against the trellis to catch them; but he is of opinion that all kinds of fruit, except grapes, lose much of their flavour if suffered to remain on the plant till dead ripe; and has, of course, always made it a practice to pull his peaches, as in this way not one half as many are lost or bruised as when suffered to fall; and the fruit, from not being dead ripe, is much fitter for carriage. He also recommends this practice, as the border being covered with moss emits a bad flavour; and nothing is so conducive to a good one as the surface being kept clean, and frequently stirred while the fruit is in a ripening state.

The Scotch Forcing Gardener supposes, that by having "two peach-houses, and a few trees planted against the open wall in a south aspect, the season may be prolonged from the first or middle of June to the first of November in constant succession, by beginning to force the first house on the first of February, and the second about the middle or latter end of March;" and that, "where there are three or four houses, and a flued wall, the season may be successively prolonged from the first of May to the first or middle of November." His mode is, to begin to force his first house on the first of December, and, as it is not much to be depended on at that early season, his second on the first of January; his third on the first of March; and the fourth left without the aid of any fire heat. He never applies fire to "flued walls until the first or middle of August, and that in order to ripen the wood, and hasten the maturity of the late fruit." And, by never reversing the successive order of the peach-houses, he thinks, they will always be "ready to vegetate at the same time of the year on the application of fire heat, with much less injury to themselves than if they were changed."

If peach-trees be forced every year, they will, he supposes, "wear out in the course of twelve or fourteen; therefore about the eighth or tenth

year young dwarfs should be planted where the riders stood, and the old dwarfs be converted into riders by degrees as the young ones advance."

For the constant certain production of this fruit, flued walls are indispensably necessary; and where a fine garden is forming, the extra expense in fluing two or three hundred feet of the best exposed wall is but trifling, as, if built on a good plan, and wrought in a judicious manner, the annual expense will not be any great affair.

The methods of protecting the blossom until the fruit be set has been explained already; we may therefore proceed to the business of applying the heat.

But before this is done a trellis, or spars of an inch square, should be fixed against the walls to the height of the first course of the flue, in order to keep the young shoots from being scorched or injured by the fire; as when it has reached the second flue, the trees may lie against the wall without danger of being hurt.

It is the custom of some, to apply fire heat to flued walls in the spring season; but this Mr. Nicol disapproves of, as no species of forcing is so intricate; the trees being placed between the extremes of heat and cold, it is quite impossible to make or regulate a climate for them. In his opinion, "all that is necessary for the production of a crop, is, ripening and hardening the wood in autumn, and screening from frosty and boisterous winds in spring."

When the buds begin to appear turgid in the spring, he advises screens to be hung up: and, "if canvass, let down in the day, from eight in the morning to five or six in the afternoon, in mild weather; but if boisterous frosty winds prevail, to continue them all day; and they should not be totally removed till about the middle of June; by which time the fruit will be fairly set, and all danger past. About the first or middle of August, according to the season and forwardness of the fruit and wood, the fires may be lighted. These must be made very moderate at first, and increased as the season advances. If the surface of the wall about the second course of the flue be kept milk warm in the night, it is, he thinks, all that is necessary;" and the quantity of fuel must not be enlarged in a stormy night in this case in the same degree as in a hot-house; as by that means all would be ruined; for the intention in the application of fire, in this instance, is not the forming a climate for the trees, but the ripening the young shoots for the production of fruit in the following season.

The nectarine admits of being forced in the same manner.

In the dwarf and double-blossomed kinds of Peach-trees the propagation is accomplished by

budding them on stocks of the same sort as those of the peach-tree.

These are principally cultivated for the purpose of ornament, as when planted in the borders of shrubberies, or other places, they are curious, and produce a fine effect early in the season. The dwarf sort is sometimes planted in pots, and when exposed with the fruit upon it has a striking appearance.

The common peach-tree may likewise be placed as a standard in sheltered situations in pleasure grounds, as it has a fine appearance when in full blow.

Culture in the Nectarine Kind.—In the propagation, culture, and management of this tree, the same attention will be necessary as in the peach. In this case it is, however, better to take the buds from old bearing trees, and not from young ones as is commonly the case. And in the pruning, particular care should be taken not to lay in the wood too thick or close.

Mr. Forsyth observes, that "on account of the smoothness of the skin, the nectarine suffers much more from millepedes or wood-lice, earwigs, &c. than the peach: it will therefore be necessary to hang up a greater number of bundles of bean-stalks about these than about other fruit-trees. Wasps are also very destructive to Nectarines, and the trees are very liable to be infested with the red spider." He advises, the walls with the stems and branches of the trees to be carefully inspected, and all the snails about them picked off and destroyed, as young snails frequently commit great depredations on the leaves before the fruit is fully ripe.

After the fall of the leaf the young shoots should, he says, be unnailed, in order to harden the wood; and in hot weather, basins formed on the borders, and mulched as for peaches. And watering with the engine is also to be practised in dry hot weather in the same manner.

The fruit should be thinned when grown to a tolerable size, but the leaves never picked off till the fruit be fully grown.

AMYRIS, a genus comprehending different balsamiferous shrubs, of the *sweet-wood* kind, and which are tender exotics for the stove.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Terebinthaceae*.

The characters of which are, that the calyx is a one-leaved, four-toothed, acute, erect, small and permanent perianthium; the corolla consists of four oblong, concave and spreading petals; the stamina have awl-shaped, erect filaments; the anthers, oblong, erect, of the length of the corolla; the pistillum has a germ, superior, ovate; the style thickish, of the length of the stamens; and the stigma is four-cornered; the

pericarpium, a drupaceous, roundish berry; and the seed, a round, shining nut.

The species are: 1. *A. elemifera*, Gum-elemi Tree; 2. *A. maritima*, Small Shrubby Sweet-Wood; 3. *A. Gileadensis*, Balsam of Gilead Tree; 4. *A. Opobalsamum*, Balsam of Mecca Tree; 5. *A. toxifera*, Poison Ash.

The first species rises in a shrubby branching manner to the height of about six feet. The leaflets are pointed, stiff and shining; the leaves being opposite on peduncles two inches long; and at the ends of the branches four or five slender stalks issue, set with many very small white flowers, in a little corymb. The petals are inflex at the tip. The fruit is the size and figure of an olive, and the colour of a pomegranate, having an odoriferous pulp within it. It is a native of Carolina and Brazil, and affords the resin known under the name of Gum-elemi.

The second species is a shrub of the Dwarf kind, branching, with a juice like that of the former, but pleasanter, and smelling like Rue. The leaflets shining, ovate, and finely notched, but scarcely an inch long; the racemes, as in the former; the fruit twice as big, of a black colour, with a purple juice. It is found on rocks by the sea-side about the Havannah.

The third, or Balsam of Gilead Tree, is a shrub with purplish branches, a little striated, having protuberant buds loaded with balsamic resin. The leaves are crowded, petioled, ternate, smooth, and the leaflets sessile, quite entire, lanceolate, somewhat acute, that at the end larger than the others, wedge-lanceolate. The flowers proceed from the same buds, by threes. Proper peduncles one-flowered, shorter than the leaf, sheathed at bottom. The bracte extremely minute, slightly bifid. It is doubted by some whether this be distinct from the following species. The Balsam of Gilead is extracted from its buds.

The fourth species is mostly represented as rising to the height of a moderate shrub. According to Bruce, one of these was five feet two inches high from the part where the red root begins, or which is buried in the earth, to that where it divides itself first into branches. The trunk at the thickest part was about five inches diameter; the wood light and open, and incapable of being polished, covered with a smooth bark of blueish white casts, like that of a standard cherry-tree in good health. Indeed a part of the bark is a reddish brown: it flattens at top like trees that are exposed to snow blasts or sea air, which gives it a stunted appearance. It is remarkable for a penury of leaves. The flowers are like those of the Acacia Tree, white

and round, only that three hang upon three filaments or stalks, where the Acacia has but one. Two of these flowers fall off and leave a single fruit; the branches that bear this are the shoots of the present year; they are of a reddish colour, and tougher than the old wood. It affords the Opobalsam, or Balsam of Mecca.

In the fifth species the leaves are pinnate; the petioles long and five-leaved. The leaflets ovate-oblong, evergreen, quite entire, opposite with a terminating one, all pedicelled. The racemes several, axillary, filiform, with scattered flowers. Catesby describes it as a small tree, with a light-coloured smooth bark, and the fruit as hanging in bunches, shaped like a pear, of a purple colour, covering an oblong hard stone. From the trunk a liquor distils as black as ink, which the inhabitants say is a poison. Birds feed on the fruit. It is a native of America.

Culture.—The propagation in these shrubby trees is the best accomplished by sowing the seeds, which must be procured from the places of their natural growth, in the early spring months, in pots of good rich mould, and then plunging them into a good bark hot-bed, very slight waterings being occasionally given. They may likewise be raised from cuttings from the young branches, which should be planted in the early spring, in pots filled with good earth, well closed about them, and immediately placed in the hot-bed, a very little water being given at the time of planting, and afterwards according as there may be a necessity for it.

From the very tender nature of these plants they require to be kept constantly in the stove, and to have the same attention bestowed upon them as others of the exotic tender kinds. They are chiefly cultivated for the purpose of affording curiosity and variety in collections of exotics.

ANACARDIUM, a genus comprising a plant of the tender exotic tree kind; the Acajou, or Cashew nut.

It belongs to the class and order *Polygamia Monœcia*, and ranks in the natural order of *Holoracææ*.

Its characters are: that it has hermaphrodite and male flowers, either mixed with the hermaphrodites, or on a distinct tree. The calyx of the former is a five-leaved perianthium; the leaflets ovate, concave, coloured, erect, and deciduous; the corolla has five petals, lanceolate, acute, three times as long as the calyx, upright at bottom, and reflex at the end; the stamina have ten filaments, united at the base and upright, nine of them capillary, shorter than the calyx, one thicker, double the length of the others, lying on the germ in front; the antheræ roundish; in the longer filament large and fer-

tile, in the rest small; the pistillum has a kidney-shaped germ, obliquely emarginate in front; the style subulate, bent in, the length of the corolla; the stigma small, roundish, depressed, and concave; no pericarpium; receptacle fleshy, very large and obovate; the seed a nut, kidney-shaped, large at the top of the receptacle, with a thick shell, cellular within, and abounding in oil. The calyx, corolla, and stamina, of the male flowers, as in the hermaphrodites; the pistillum has either no germ, or one that is abortive.

There is only one species, the *A. occidentale*, Cashew Nut Tree, Cassu, or Acajou.

In its native state this is said to rise to the height of a tree; but according to Brown from twelve to sixteen feet, spreading much as it advances from the distance of five feet from the ground. It here, however, only rises to the height of a small shrub. The leaves are coriaceous, subovate, shining, and quite entire, petioled and scattered alternately. The panicles are corymbd, diffused and terminating, containing numerous sweet-smelling flowers, resting on an oblong receptacle, hardly to be distinguished from the peduncle. The corolla is red, and has commonly ten stamina, one of which has no anther, but there is often not more than seven or eight, all of which are fertile. Occasionally there are female flowers entirely destitute of stamina.

The fruit is varied in colour, some of the apples being yellow and others red, according to circumstances. The flavour is agreeably subacid with a degree of astringency. The nut springs from one end of the apple, and is somewhat of the size and shape of the kidney in the hare, being the largest at the end which is attached to the fruit. The outer shell is of an ash colour, and very smooth; beneath which is another covering that envelopes the kernel, and between these a thick inflammable oily substance is deposited, which is very caustic in its properties, often affecting the mouth when incautiously put into it to be cracked.

Culture.—The propagation in this plant is effected by setting the nuts, which are procured from America, in small separate pots of light sandy earth, and then ploughing them into a good bark bed, without any water being admitted till the plants are come up, as the nuts are apt to rot by moisture. If the nuts be fresh the plants soon advance to the height of four or five inches, but do not make a great progress afterwards. As they do not bear transplanting, the best method is to break the pots at the time of their removal, being cautious to preserve the mould about them, so as to place them in pots a size larger without its being much disturbed.

These should be immediately filled up with earth of the same sort as above, and replaced in the bark hot-bed. The plants should not be removed oftener than once a year, when care should be taken that the pots are not too large, as they require the roots to be confined in order to their thriving well.

It is necessary to keep the plants constantly in the stove, as they are too tender to stand the exposure of the atmosphere in the warmest season of the year in this climate, even in the green-house. As they are of a succulent nature little water is required even during the summer season; and in the winter a very little, once a fortnight will be sufficient. In this way they may be kept several years, but they grow but slowly after the first, seldom rising to more than two feet or two feet and a half in height.

The juice expressed from the fruit of this tree in its native state, when fermented, affords an agreeable wine; and by distillation a spirit is drawn from it which is preferable to arrack and rum in the making of punch. The fruit is sometimes sliced and used in punch for the purpose of giving it a fine flavour.

The kernel of the nut in its fresh state has a delicious taste, and abounds with a saccharine milky juice.

The oil which it affords is an admirable preserver of timber; and the milky juice obtained from the body of the tree produces an indelible black colour on linen. It likewise produces an astringent gummy substance.

ANAGALLIS, a genus comprising a plant of the herbaceous perennial kind, which is known by the name of Pimpernel.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

Its characters are: that the calyx is a five-parted, sharp, and permanent perianthium: the divisions keeled: the corolla is wheel-shaped: the border five-parted: divisions ovate-orbiculate, with the claws connected: the stamina have erect filaments, shorter than the corolla, shaggy below; anthers simple: the pistillum is a globose germ, style filiform, slightly bending, and the stigma capitate: the pericarpium is a globose, one-celled capsule, opening transversely: the seeds are very many and angular: the receptacle globose, very large.

The species chiefly cultivated in the garden is the *A. Monelli*, Upright Perennial Anagallis, or Pimpernel.

It is an erect plant about a foot in height, rather bushy, closely adorned with leaves in pairs or threes. It affords in April and May a great number of wheel-shaped blue flowers,

resting on long foot-stalks, which have a good effect. It is a native of Italy.

Culture.—This plant is not difficult in its propagation, which may be either by sowing the seeds or by cuttings. In the first method the business should be performed in April on a warm border, the seed being very lightly raked in; but in the latter it must be done in the summer season, a shady situation being chosen for the purpose. In either method the plants must be potted and placed in the house during the winter season. They require moving occasionally into larger pots, which should always be done with a ball of earth about their roots. Moderate waterings are likewise necessary.

This is a plant which is employed for the purpose of ornament in the green-house.

ANAGYRIS, a genus comprehending plants of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

Its characters are: that the calyx is a bell-shaped perianthium, mouth five-toothed, the upper pair of teeth being more deeply divided: the corolla papilionaceous, standard obcordate, straight, emarginate, broader than the other petals, and twice as long as the calyx: wings ovate-oblong, flat, longer than the standard, keel straight and very long: the stamina have filaments parallel, distinct, rising: anthers simple: the pistillum is an oblong germ; the style simple and rising: the stigma villose: the pericarpium an oblong, large, roundish, obtuse legume, a little reflex: the seeds six or more, kidney-shaped.

The species cultivated are: 1. *A. foetida*, Stinking Anagyris, or Bean Trefoil; 2. *A. Cretica*, Cretan Stinking Anagyris, or Bean Trefoil.

The first is a shrub that usually grows to the height of eight or ten feet. The leaves are oval, and the flowers, which are produced in April or May, are of a bright yellow colour, butterfly-shaped, hanging in long spikes from the sides of the branches, somewhat as in the Laburnum. It never ripens its seeds in this climate. It is a native of the south of France, Spain, and Italy.

The second sort has the leaves longer, and also the spikes of flowers. It also flowers later in the summer, and never matures its seed. It is supposed by some to be only a variety. It is a native of Candia.

Culture.—These plants are capable of being propagated, either by means of layers or seed. The first method is adopted in order to obviate

the defects of their not producing seed. In performing the operation, the tender branches should be chosen, and it is best done in the spring season, when they should be tongued in the same way as in Carnations. In dry seasons water should be given: a rather shady place is best for the purpose. In the following spring, when the layers have fully taken root, they may be separated from the old plants just before they begin to bud, and be then planted in warm aspects, as when much exposed they are apt to be destroyed in severe winters.

In raising them from the seeds, which is probably the best method, as the plants become taller and handsomer, the method is to sow them in pots placed in a moderate hot-bed about the beginning of March. It may also be done on a warm border of fine rich earth, covering them well with sifted mould, and then protecting them by a glass frame. The seeds are procured from abroad. When the seed is good the plants appear in the course of a month, when they should be gradually habituated to the open air, into which they may be brought about the end of May, being put in sheltered warm situations: this can only be done with those in pots, as they do not bear transplanting well till the following spring. They should be protected under a glass frame in the nights the two first winters, as they do not bear cold well. After they have been kept exposed in pots for about three years, they will be in a condition to plant out where they are to remain. The best season for this is in April, just before they protrude their leaves. They should be turned out of the pots, or be taken up with good balls to their roots, and immediately planted in warm situations, being protected in the winters by tanners' bark about their roots, and coverings of mats or their tops. The fourth year from sowing they usually begin to produce flowers, and continue flowering annually afterwards.

They are highly ornamental, and extremely proper for being mixed with other flowering shrubs of similar growth in warm situations, in shrubberies and other places.

ANANAS. See BROMELIA.

ANASTATICA, a genus including some curious plants of the low bushy annual kind, known by the title of Rose of Jericho.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliculosæ*.

The characters of which are: that the calyx is a four-leaved and deciduous perianthium, leaflets ovate, oblong, concave, erect and deciduous: the corolla is tetrapetalous and cruciform; the petals roundish, flat, and spreading,

with claws nearly as long as the calyx, but more spreading: the stamina have six filaments, subulate, of the length of the calyx, from erect spreading; anthers roundish: the pistillum has a bifid, very small germ; subulate style, of the length of the stamens, and permanent: the stigma capitate: the pericarpium is a very short silicle; partition ending in a subulate point, oblique and longer than the silicle itself, the valves parallel, making a cell of the lower half, but standing out from the upper, rounded, concave, gaping, and oblique, and hence having the form of a sheep's hoof: the seeds are solitary and roundish.

The species are: 1. *A. hierochuntica*, Common Anastatica, or Rose of Jericho; 2. *A. Syriaca*, Syrian Anastatica.

The first rises five or six inches in height, dividing into many irregular branches. The stalks are ligneous, though the plant is annual; the leaves fleshy and glaucous. The flowers, which are small and white, are disposed in short spikes at the wings of the stalks, and have little beauty; they are succeeded by short prickly pods, having two cells, in each of which are two seeds. It is cultivated in some gardens for the oddness of the plant, which, if taken up before it is withered, and kept entire in a dry room, may be long preserved; and afterwards if the root be placed in a glass of water a few hours, the buds of flowers will swell, open, and appear as if the plant was newly taken out of the ground. It is a native of Palestine.

The second species has the stem hard, a foot in height, dichotomous from the bottom, branches spreading: the leaves rough with tubercles bearing hairs, which are simple, bifid or trifid; one or two sessile flowers in the axils, and others running out into long loose spikes: the calyxes villose, scarcely half a line in length, rather erect: the petals white, one or two seeds in each cell: the valves tough, so as not to be torn without difficulty. It has a small, sub-globular, drupaceous silicle, ending in a subulate style; below which it is divided by a deep longitudinal furrow, and transversely striated, spherically gibbose at the sides, and rough with tubercles, or hispid with bristles: the skin scarcely any; the shell bony, two-celled: the seeds solitary, ovate, plano-convex, and pale-coloured. It is a native of Austria. Flowers in May and June.

Culture.—The propagation in these is effected by sowing the seeds on a hot-bed in the latter end of March or beginning of April, potting the plants towards the latter end of May, bringing them forward on a gentle hot-bed, and gradually exposing them to the full air. In this

way they will flower in June, and with proper shelter and protection frequently perfect seed in the autumn. The seed will, however, come up in the open ground where the soil is fine, light, and dry; but the plants seldom rise to any size.

ANCHOVY PEAR. See **GRAS.**

ANCHUSA, a genus comprising several plants, chiefly of the herbaceous perennial kind, of hardy growth, and of the Bugloss kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters of which are: that the calyx is a five-parted, oblong, round, acute, and permanent perianthium: the corolla is monopetalous and funnel-shaped: tube cylindrical, of the length of the calyx; limb semiquinquefid, from erect, expanding, and obtuse; throat closed with five small scales; convex, prominent, oblong, and converging: the stamina have very short filaments in the throat of the corolla: anthers oblong, incumbent, and covered: the pistillum has four germs: the style filiform, of the length of the stamina; stigma obtuse and emarginate; no pericarpium, but the calyx enlarged and erect, contains the seeds in its bosom: the seeds are four, oblongish, obtuse, and gibbose.

The species that are most deserving of cultivation are: 1. *A. officinalis*, Garden Alkanet, or Bugloss; 2. *A. undulata*, Waved Alkanet; 3. *A. virginica*, Virginian Yellow Alkanet; 4. *A. sempervirens*, Evergreen Alkanet.

The first has the stems from a foot to eighteen inches in height and more, the thickness of a finger, slightly angular, hairy and rough. The leaves slightly decurrent, seven inches long, above an inch broad, hairy and rough. The spikes conjugate, terminating the stem; the flowers sessile, in a double row: the calyx hirsute: the corollas purple, near half an inch in diameter. At first opening they are red, but afterwards become purple. Sometimes they are white. It flowers in June, July, and August; and the seeds ripen in a month. It is a native of Italy, Spain, &c.

There are several varieties of it; as, Common Bugloss with blue flowers, with white flowers, with red flowers.

The second species is in height three feet, with many strong lateral branches, produced from the main stem near the ground. The leaves stiff and rough, six or seven inches long, and about half an inch broad at the top, closely embracing the branches at the base, where they are two inches broad; indented and waved on their edges; the upper surface beset with hairs, and very rough to the touch. The spikes of flowers

axillary, a foot or more in length, and reflex. The corollas fine blue. It is a native of Spain, &c.

The third seldom rises a foot in height where the soil is good; and where it is poor not more than half that height. Its flowers grow in loose spikes upon a smooth stalk. It is perennial, flowers early, and is a native of North America.

The fourth species has the stems at the sides of the crown of the root, hispid. The leaves ovate, marked with lines, petiolate, and remote. The peduncles axillary; with two bractes, opposite, sessile, lanceolate-ovate, many-flowered: the corollas blue, with a short tube, rather salver-shaped than funnel-shaped: the calyx thick set with long, white, bristly hairs: the segments rather longer than the tube of the corolla: the germs imbedded in a hollow, glandular receptacle, one or two generally abortive: the seeds rough, of a bony hardness. It is found native in Spain and Italy.

Culture.—All the sorts may be propagated by the roots, care being taken to plant them on such soils as are pretty dry. They are likewise capable of being raised by sowing the seeds in the autumnal season upon beds of sandy earth, and in the following spring removing the plants that are sufficiently strong, and setting them out in beds two feet apart, water being occasionally given. They also all come up well from the self-sown seed. They may be made use of for the purpose of ornament, where a great variety of easy cultivated plants are wanted, though they possess but little beauty.

ANDRACHNE, a genus comprehending plants of the herbaceous and shrubby exotic kinds.

It belongs to the class and order *Montecia Gynandria*, and ranks in the natural order *Tricocceæ*.

The characters of which are: that it has male and female flowers: in the former the calyx is a five-leaved, equal, marcescent perianthium: the corolla has five petals, emarginate, slender, and shorter than the calyx: the nectary has five leaflets, semibifid, herbaceous, one within each petal, and less than it: the stamina have five filaments, small, inserted into the rudiment of each style, and simple anthers: in the latter the calyx is a five-leaved, equal, permanent perianthium: the corolla has no petals: the nectary as in the male: the pistillum is a germ superior and globose: the styles three, filiform, and two parted: the stigmas globose: the pericarpium is a capsule, globose-trilobate, three-celled, cells bivalved, of the size of the calyx: the seeds are in pairs, rounded on one side, triangular and obtuse on the other.

The species are: 1. *A. telephoides*, or Bastard Orphine; 2. *A. fruticosa*, or Shrubby Andrachne.

The first is a low plant; whose branches trail on the ground. The leaves are small, of an oval shape, smooth, and of a sea-green colour. It is found native in some parts of Italy, and the Archipelago.

The second species rises twelve or fourteen feet in height: the branches have spear-shaped, pointed, smooth leaves, under which the peduncles are produced: these are pretty long, and hang downwards: the flowers are small, of an herbaceous white colour, some of which are male, and others female; but when the latter are situated at too great distance from the former, there are rarely any seeds within their covers, though they seem very fair to the sight. It is a native of the East Indies.

Culture.—In the first sort, which is annual, the propagation is effected by sowing the seeds on a moderate hot-bed in March; and, after the plants are sufficiently high, transplanting them into small pots, to be further brought forward by another very moderate hot-bed, full supplies of fresh air being admitted in mild weather, and occasional waterings. They produce flowers in June, and the seeds become ripe in September, after which the plants decay.

The second sort is capable of being raised either by seeds or cuttings; but it is a very tender plant. The seeds may be sown in pots, and plunged into a bark hot-bed, watering them occasionally as the mould becomes dry in the pots. When the plants are of sufficient growth, they should be removed into separate pots, and plunged into a bark bed, being shaded till they have stricken fresh root; free air being afterwards admitted, and the plants kept constantly in the stove.

In raising them by cuttings, some of the shoots should be selected, and placed in pots of rich earth, then plunged in a hot-bed. After they have taken root they should be removed into the bark-stove, where they must remain.

ANDROMEDA, a genus comprising plants of the tree and shrub kind, which are mostly of the hardy deciduous bushy sort.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters of which are: that the calyx is a five-parted, acute, very small, coloured, and permanent perianthium: the corolla is monopetalous, campanulate, and quinquesfid, clefts reflex: the stamina have subulate filaments, shorter than the corolla, and scarcely fixed to it: the anthers two-horned and nodding: the

pistillum is a roundish germ : the style cylindric, longer than the stamens, and permanent ; stigma obtuse : the pericarpium is a capsule, roundish, five-cornered, five-celled, five-valved, opening at the corners, partitions contrary, and the seeds are very numerous, roundish, and shining.—*Obs.* It differs from *Erica* in number. In some species the corolla is ovate, in others perfectly campanulate. The anthers in some are awned, in others awnless.

The species are numerous ; but those principally cultivated are : 1. *A. arborea*, Tree Andromeda, or Sorrel Tree ; 2. *A. Mariana*, Maryland Andromeda ; 3. *A. polifolia*, Marsh Andromeda ; 4. *A. Dabecia*, Cantabrian Heath, or Trailing Andromeda ; 5. *A. paniculata*, Panicked Andromeda ; 6. *A. racemosa*, Branching Andromeda ; 7. *A. coriacea*, Thick-leaved Andromeda ; 8. *A. acuminata*, Acute-leaved Andromeda ; 9. *A. calyculata*, Calyced Andromeda ; 10. *A. salicifolia*, Willow-leaved Andromeda ; 11. *A. buxifolia*, Box-leaved Andromeda.

The first is a shrub growing ten or twelve feet high in Virginia ; but in Carolina it rises to the height of twenty feet. The branches are very slender, bending downwards : the leaves are oblong, oval, pointed, alternate : the flowers grow in long, naked spikes from the sides of the branches : they are of a herbaceous colour, and ranged on one side of the stalk.

In the second species the leaves are oval, entire, and alternate : the corolla rather cylindric-bell-shaped ; anthers without awns. The corollas are shaped like those of the *Arbutus*, and are of a herbaceous colour. They appear in June and July, and sometimes are succeeded by fruit, which seldom ripens in this climate. There are two varieties ; one with oval leaves, another with oblong leaves. It is a native of North America.

The third is an elegant little shrub, from six or eight inches to a foot in height, erect and branched. The leaves sessile, rigid, elliptical, their edges turned back ; the under surface glaucous : the peduncles long, of a bright red colour, arising from the summits of the branches, each supporting one oval, nodding flower. The calyx is red, and the corolla of a pink colour. The anthers awned ; style white, with a purple stigma. It is a native of America.

There are several varieties ; as, with broad oblong leaves ; with spear-shaped leaves ; with narrow linear leaves.

The fourth species has the stalks and branches low and trailing. The leaves are spear-shaped, revolute, and alternate. The flowers are borne on a single terminal raceme, on alternate undi-

vided subviscid pedicels, with a linear bracte under each. The calyx four-leaved, awl-shaped, erect, purplish, one-fourth of the length of the corolla, and deciduous. The corolla purple, cylindric-oval, twice as large as that of the third species ; the mouth quadrifid and a little contracted ; the divisions bent back. The stamens eight, with white filaments : anthers the length of the filaments, scarcely shorter than the corolla, brown, sagittate, awnless, truncate at top, with two holes : the style filiform, the length of the corolla ; stigma obtuse, subquad-rifid. The seed vessel is a four-celled four-valved capsule. It grows well in the Irish bogs, and flowers in June and July. It is observed by Martyn, that this species has the habit or air of an Andromeda, but the character of an *Erica*.

The fifth has the stem about four feet high : the leaves are oblong, crenated and alternate : the flowers grow in loose spikes from the ends of the branches, and are shaped like those of the *Arbutus*, but are a little longer, and appear in July ; but do not produce seeds in this country. In this the anthers are awned. It is a native of Virginia.

The sixth species differs from the above in the racemes being less paniced ; in having a linear, lanceolate, stiff, green, deciduous, bracte, under each flower, longer than it ; in the capsules retaining the style ; and in the leaves being more serrate.

In the seventh species the branches are three-cornered ; the leaves ovate, entire, and shining. It flowers from July to August, and is a native of North America.

The eighth is a shrub about four feet in height, upright, and the whole of it smooth, with round branches, which are leafy to a considerable extent. The leaves alternate, petioled, two inches long, either quite entire, or very obscurely and unequally crenulate, coriaceous, somewhat rigid, very smooth beneath, almost lucid on the upper surface, reticulate with small veins when looked at through a magnifying glass : the racemes are axillary, solitary : there are also others which come out from the branches themselves without any leaf ; they are many-flowered, much shorter than the leaves, and spread out horizontally : the pedicels slender and pendulous : the flowers smell like honey : the perianth is green : the corolla snow-white, almost cylindric, with a flat base, and a small, obtuse, five-toothed, revolute border. It flowers in July and August. It is a native of North America.

The ninth species is a low shrub : the leaves shaped like those of the Box-tree, and of the same consistence ; with small punctures on them. The flowers grow in short spikes from the extre-

mities of the branches : they are produced single, between two leaves, and are white : the leaflets are oval on the racemes, and from the axil of each proceeds a solitary pedicelled flower : the calyx is covered at the base with two ovate leaflets : the anthers are oblong, bifid, and awnless. It is a native of Sweden. It affects a mossy soil.

There are varieties with oval leaves, with globe flowers.

In the tenth species the stem is arboreous, with vimineous, subflexuose, round, smooth, leafy branches, flower-bearing at the end. The leaves perennial, alternate, petioled, from erect spreading, with the edges a little rolled back ; the upper surface smooth, with two longitudinal vessels parallel to the nerve, giving it the appearance of being three-nerved ; the lower whitish, with a stout reddish nerve, reticulately veined ; the petioles channelled, and smooth : the racemes subpanicled and terminating : the pedicels all directed the same way, alternate, simple, short, angular, without bractes ; when flower-bearing they nod, but when in fruit they are from erect spreading : the calyx five-cleft beyond the middle, wrinkled, fleshy, smooth, sometimes ciliate ; the clefts deltoid, bluntish, slightly keeled. The corolla thrice the length of the calyx, ovate-cylindrical ; clefts small, roundish, blunt, and a little turned back : the filaments bent, villose, dilated at the base : anthers upright, oblong, awnless, two-celled, opening at the top in two pores, gibbous at the base : the germ obscurely five-lobed, and smooth : the style almost the length of the corolla, straight, subquingular : the stigma blunt, with five papillose glands : the capsule woody, smooth, oblong : the valves concave outwardly, inwardly bearing a partition from the middle : the seeds numerous, small, and oblong. It is a native of the island of Mauritius.

In the eleventh the stem is shrubby ; with round, smooth, leafy branches, flower-bearing at top. The leaves perennial, scattered, spreading, blunt, a little rolled back at the edge, bright green and smooth above ; beneath whitish, reticulately-veined, with a stout midrib : the petioles short, channelled, and wrinkled : the racemes towards the top of the twigs axillary, scarcely terminating, straight, simple, angular, slightly pubescent, without bractes, when in flower nodding a little, when in fruit from erect spreading : the flowers in every respect similar to those of the former, except that the calyxes are more ciliate, and the segments of the corollas erect. The unripe fruit is slightly pubescent, but the structure is the same as in the above.

These two species scarcely differ in their fructification : the structure of their leaves is also the same, and they are only distinguished by the form of their leaves ; this having none of those lines parallel to the midrib which are so conspicuous in the other species. It is a native of the isle of Bourbon.

Culture.—These plants are capable of being raised or propagated in different ways ; as by seeds, by layers, and by their creeping roots. They all delight in a rather moist boggy soil.

In the sorts that are raised by seeds, which are those brought from America, they should be sown on a moist bed of earth in the spring season, and care taken to keep them clean from weeds, and the ground in a sufficient state of moisture till they are come up.

In raising them by layers, the autumn is the best season for performing the business, a rather boggy shaded situation being chosen for the purpose. The most tender shoots are the properest for being laid down.

In increasing them by the roots, which may be done in all the shrubby sorts, after the suckers are come up and pretty well grown, they should be taken off with as many fibres to the roots as possible, and planted out in the situations where they are intended to remain, as they do not succeed well when often removed. The early part of the autumn is the best time for the purpose.

The first sort is tender, requiring to be protected from frost in the winter season ; it should therefore be kept in the green-house with a tolerable degree of heat. It also requires much moisture in the summer season.

The other species may be admitted in shrubberies, clumps, and other places, for the purpose of affording variety and ornament. They succeed best when the soil inclines to the boggy kind, or where the land is not too dry in the summer.

The two last species are very beautiful plants.

ANDRYALA, a genus comprising plants of the hardy annual, and green-house kinds.

It belongs to the class and order *Syngenesia Polygamia æqualis*, and ranks in the natural order of *Compositæ Semiflosculosa*.

The characters of which are : that the calyx is common, many-parted, short, rounded and villose ; the scales very many, sub-equal, subulate, in a double row ; the corolla is compound, imbricate, and uniform : the corollules are hermaphrodite, numerous and equal ; each ligulate, linear, truncate, and five-toothed ; the stamina consist of five capillary filaments, very short : the anther cylindrical and tubulose : the pistillum consists of an ovate germ : the style

filiform and the length of the stamina; the stigmas are two and reflex; the pericarpium none; the calyx converging and globose; the seeds solitary and ovate; the down capillary, the length of the calyx and sessile; the receptaculum villous and flattish, alveolate and hairy.

The species of most importance are: 1. *A. integrifolia*, Hoary Andryala; 2. *A. cheiranthifolia*, Various-leaved Andryala; 3. *A. ragusina*, Downy Andryala; 4. *A. lanata*, Woolly Andryala.

The first rises to near a foot and half in height, with woolly branching stems, having the leaves scatteringly set on, which are oblong and downy. The flowers, which are produced in small clusters at the top of the stalks, are of a yellow colour. It flowers in July, and the seeds ripen in September. It is annual, and a native of the south of France.

The second species rises three feet in height: the stem is erect, herbaceous, simple, branch-panicked, at top round, size of the finger, shaggy, marked with the scars of the leaves. The branches alternate, loose, and they and the whole plant covered with a down, glanduliferous at the tips: the glands tawny, and somewhat viscid: the leaves alternate, close, sessile, or half stem-clasping; the upper ones lanceolate, entire, gradually less: the panicle terminal, branching, leafy, and very loose: the flowers yellow, scarcely nodding: the peduncles stiff, one-flowered, round, longer than the opposite leaf: the bracte linear or subulate, sessile, deciduous, with other leafy bractes permanent. It is perennial, and a native of the island of Madeira.

In the third species the lower leaves are about four inches long, but little more than half an inch broad, and very hoary. The stems weak, nine inches in height, dividing towards the top into two or three smaller branches, and at each joint a small leaf almost entire; one yellow flower terminates every branch in June and July. It has been received from the Cape and Algiers.

In the fourth the root is thick and fibrous: the leaves broader, longer, and more downy: the flower-stems near two feet in height, with a single leaf at each joint, whence arise peduncles, each sustaining one large yellow flower. The whole plant is white. It is biennial, and flowers in June; the seeds ripen in August.

Culture.—All these plants are capable of being raised from seeds. In the first sort they should be sown in the spring, in situations in which the plants are to remain, nothing further being required but the proper thinning of them, and the keeping of them perfectly free from weeds.

In the second and third species the seeds should be sown in pots of good earth in the spring, and plunged into a mild hot-bed, in order to be brought gently forward. The former is likewise capable of being propagated by its creeping roots, which may be taken off either in the early autumn or spring seasons. When protected by means of a green-house, they flower the whole of the summer after perfecting their seeds.

The third species, from its hoary appearance, has a fine effect when intermixed with others that have green leaves. When placed abroad, it requires a dry soil and very warm situation.

ANEMONE, a genus comprehending several plants of the tuberos-rooted flowery ornamental kind; being perennial in their roots, but annual in their stems and flowers.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that it has no calyx; that the corolla has petals in two or three rows, three in a row, somewhat oblong: the stamina have numerous filaments, capillary, half the length of the corolla: the anthers twin and erect: the pistillum has numerous germs in a head, the styles acuminate, and the stigmas obtuse: no pericarpium: the receptacle globular or oblong, hollowed, and dotted: the seeds very many, acuminate, retaining the style.

The species are very numerous; but those that most deserve the cultivator's attention in the Anemone kind are: 1. *A. coronaria*, Narrow-leaved Garden Anemone; 2. *A. hortensis*, Broad-leaved Garden Anemone; 3. *A. nemorosa*, Wood Anemone; 4. *A. apennina*, Mountain-blue Wood Anemone; 5. *A. ranunculoides*, Yellow-wood Anemone.

In the first species the flower-stems rise between the leaves immediately from the roots, two, three, or more from the same root, to the height of eight, ten, or twelve inches, having a leafy appendage or involucre a little above the middle. The radical leaves are deeply divided into numerous segments, which are subdivided by threes into many narrow divisions. At the top each stem is adorned with a flower, which in the double sorts is large and very ornamental. It is a native of the Levant, where it grows single, but has been rendered double by cultivation.

The varieties are very numerous: in the single sorts, the Watchet or Pale Blue; the Common Purple; the Scarlet, and many intermediate varieties. In the double kinds, the Common Double Red and Scarlet; the Parti-coloured Crimson; the Crimson Velvet; the Great

Double Blush; the White; the Lesser Blush; the Purple; the Blue; the Rose-coloured; the Carnation; the Purple Velvet; the Purple Velvet of three colours; the Double Brimstone; the Green, &c.

In the second sort the stems rise to the same height. According to Haller, the root-leaves are of two kinds; one very deeply gashed, so that they have the appearance of being five-fingered, but are in reality three-parted, the side-lobes being two-parted to the very base; all the lobes are narrow and sharp: the side ones deeply bifid, the middle ones trifid or quadrifid, the extreme ones sharply lanceolate: the other kind broad, deeply three-lobed, blunt, bluntly and shortly serrate at the tip, with an awn standing out. The leaf on the stem, or involucre, is ternate, the leaflets ovate-lanceolate. The peduncle is solitary and one-flowered, as in the first: the petals three times three (in the natural single flowers), long, elliptic, marked with lines, the outer ones subhirsute on the outside, white at the base with green lines. The roots in this as well as the first consist of small tubers.

There are several varieties of this both with single and double flowers: the single and double Yellow: the Purple Starre Anemone, darker and paler; Violet Purple; Purple striped; Carnation; Gredeline, between a peach-colour and a violet; Cochenille, of a fine reddish violet or purple; Cardinal, of a rich crimson red; Bloud-red, of a deeper, but not so lively a red; Crimson; Stamell, near unto a scarlet; Incarnadine, of a fine delayed red or flesh-colour; Spanish Incarnate, of a lively flesh-colour, shadowed with yellow; Blush, of a fair whitish red; Nutmegge, of a dark whitish colour, striped with veins of a blush-colour; Monk's-gray, pale whitish tending to a gray; Great Orange Tawnie; Lesser Orange Tawnie: in the double, the great double Anemone of Constantinople, or Spanish Marigold; great double Orange Tawnie; double Anemone of Cyprus; double Persian Anemone; the common great double Variable Anemone; common double and variegated Scarlet; Red and Purple; variegated of these colours.

The best Star-Anemones are said to come from Brittany, where they raise yearly many fine sorts.

In the third species the root is perennial and creeping. The height of the whole plant from five to ten inches: the stem single, round, and pubescent; bearing one leaf, and one flower. The leaf is doubly ternate; each part being petioled; the petiole is flat and broad, particularly at the base; each part, or leaf (for some consider it as three leaves) is trifid; each leaflet

being gash-serrate, and hairy underneath, especially on the nerves: The peduncle is from an inch to two inches in length, is only a continuation of the stem, and springs from the centre of the leaf. The flower consists of six or seven oblong-ovate petals, sometimes ending bluntly, sometimes emarginate, and the Editor of Miller's Dictionary has observed them not unfrequently even gashed or lacerate. The usual colour is white, but they are often tinged with purple on the outside, particularly the three outer ones; and sometimes they are entirely purple on both sides. The joint of the stem, and the backs of the leaves are also apt to be tinged with red.

The varieties are: with single flowers, with double white flowers, with single purple flowers, with double purple flowers, and with reddish purple flowers.

In the fourth species the root is perennial and tuberous; the stem round, purplish, and about a span high: the root-leaves on long petioles, ternate, and leaflets usually three-parted; the segments variously cut and divided, somewhat pointed, hairy on both sides; one three-parted leaf, or three leaves together on the stem, like the others, but on short, sheathing petioles. From the centre of these arises the peduncle, about a hand high, round and purplish, except near the flower, where it is green. The stem, leaves, and peduncle, are commonly slightly hairy; the flowers are upright, of a pale blue colour, and sweet smell; the petals oblong, from twelve to fifteen, and disposed in three rows. It flowers in April.

The varieties are: with single blue flowers, with double blue flowers, with single violet-coloured flowers, with double violet-coloured flowers.

The fifth differs from the above in having a yellow corolla, two petals alternately outer, and two inner, and one having one side within and the other side without the next petal; whereas that has three outer and three inner petals: it differs also in the peduncles being accompanied with two leaflets, the latter of which is furnished with three at the base. It flowers a little earlier than the other. It has sometimes two flowers on a stem, though often but one, the peduncles villose and short, so that the flower scarcely rises above the leaves: the petals are five, and roundish; the stamens about fifty. It grows wild in Sweden, &c.

In the Pulsatilla, or Pasque-flower sort, the species are: 1. *A. pulsatilla*, Pasque-flower; 2. *A. patens*, Woolly-leaved Pulsatilla, or Anemone; 3. *A. vernalis*, Early Spring Pulsatilla, or Anemone.

In the first species the peduncles are erect and round, from four to seven or eight inches in height, villose, one-flowered; lengthening after the flowering is past. The involucre multifid, with the divisions linear and villose. It sits close to the flower, but when that is fallen it is found almost in the middle of the peduncle. The corolla speciosus, and purple in colour; the petals lanceolate, and villose without; the seeds ovate, tailed, hairy, and scarcely adhering to the receptacle: the leaves rough and finely cut, with three or four pairs of pinnae and pinnules. It grows naturally in Sweden, and flowers in April.

The varieties are: with single blue flowers, with double blue flowers, with single and double white flowers, with single and double red flowers, and with violet-coloured flowers.

The second has the root perennial; the root-leaves are ternate-digitate; leaflets sessile, lacinate and acuminate, the middle leaflet tripartite, the side ones bipartite; the scape one-flowered, shorter than the leaves; the involucre remote and villose; the corolla white and villose underneath; the stamens yellow. It is a native of Siberia.

The third species has the flower red without, white within; it blows earlier than the Pasque-flower; the leaves approach those of Meadow-Rue; the stem is half a foot high, with a very tomentose, yellow, shining involucre in the middle, finely cut. When the flower is young, it is white with a blush of purple on the outside, where it is hairy: these hairs afterwards become yellow. The corolla consists of six convergent ovate-lanceolate petals; the stamens are very numerous. It grows in the woods in Sweden, &c.

In the *Hepatica* kind the only species is the *A. Hepatica*, or *Hepatica*.

In this the leaves of the year before remain, which are heart-shaped, three-lobed, obtuse, and smooth, beneath being veined in net-work: the petioles are cylindric, long, and rising: the bud has generally four outer scales, ovate and membranaceous; three inner ones, concealing the leaves and flowers; the peduncles three, cylindric, hairy, and one-flowered. The flower lies a year complete in all its parts within the bud. The corolla has six petals in two rows of three each, lanceolate, and spreading: the stamens are about twenty-five: the seeds oblong-ovate, involved in a silky substance; but many of them abortive. It is found wild in Sweden, &c. It flowers early.

The varieties in cultivation are numerous: the single and double blue, single and double red or peach-coloured, single and double white,

single and double variegated red and white, single and double violet-coloured, with striped leaves.

Culture in the Garden kinds.—All the species and varieties of the garden and wood *Anemones* are capable of being propagated by offsets from, or dividing their roots. By sowing the seed, new varieties may also be obtained.

In order to procure the offsets, and dig over and prepare the beds, the best sorts should be annually taken up immediately on their leaves beginning to decay, as in the early part of June for the more forward sorts. They must then be divided, or have the offset knobs taken off. This work should always be performed in a dry season, the root-bulbs, after the earth has been removed, being deposited on a mat, in an airy dry place, where there is not much sun, being spread out in a thin manner. When they are become quite dry, the remainder of the earth should be rubbed off them, and they may be put up in bags or boxes, and placed in a situation where they cannot be injured by vermin. The roots should not be too much parted where they are intended to flower strongly, and each part should be furnished with a good eye. Where the taking up has been delayed till the roots begin to make new shoots, it will be too late to remove them that season.

In planting the roots or sets thus procured, or which have been purchased from the seedsmen, such situations should be chosen for blowing them in as are free from much moisture, and where the exposure is open to the influence of the sun and air, and free from the shade of trees. They will succeed and flower in tolerable perfection in any soil that is sufficiently light and friable in the mould; but in order to have them blow in the greatest perfection, beds should be prepared with earthy mixtures, made by taking off the surface of such lands as have been long in the state of sward, to the depth of eight or ten inches, where the earth is of the light sandy or hazel mould kind, throwing it up for some time that it may rot and become perfectly mellow; when rotten cow-dung, in the proportion of one-third, should be incorporated with it, by having them thrown up together into a heap, and frequently turned over afterwards; the stones and clods being carefully raked out and reduced; but the earth should not be sifted, as it is apt by such means to become too stiff and compact. Some advise the addition of drift or sea-sand, in the quantity of about one-fourth.

With this earth beds must be formed for the reception of the roots: these should be marked out to the breadth of about three feet and an

half, with length sufficient for the quantity of roots, having alleys between them of from a foot to eighteen inches. The prepared mould is then to be dug or filled in to the depth of twelve or sixteen inches, leaving the surfaces of the beds from three to six inches above the common level of the ground, according to the wetness of the soil, giving them a little convexity when there is much moisture. Some recommend the putting of a layer of well-rotted cow-dung, about five inches in thickness, below the compost materials. The surface of the beds should be raked even before the roots are put in. In planting, six rows should be put in each bed, the roots being set at the distance of six inches from each other in the rows, and to the depth of two or three inches. When this has been done, the surface should be made smooth by raking it over lightly.

The time of planting should vary according to that which it is intended they should blow at. The best season where early flowering is intended is in the latter end of September or the beginning of the following month; for a middle flowering, about the middle of October; and for late flowering, the latter end of February. In this mode of planting a succession of flowers may be provided from April till the middle of June. Those roots that are planted the earliest are in general the strongest, and afford the best flowers, as well as the greatest increase of off-sets. It is always advisable to keep a few roots out of the ground till the spring season, for the purpose of a succession of flowers, and lest the early planted ones should be injured by the severity of the winter, which is sometimes the case where they are not covered to protect them from frost. These spring-planted roots flower a fortnight or three weeks after those which were planted in autumn, and many times blow equally as fair, especially if it prove a moist spring, and care be taken to refresh them gently with water.

But the increase of these roots will not be near so great as in those of the first planting, provided they are not hurt in winter; and it is for this reason that those who deal in these roots are forward in planting; as, although it may sometimes happen, by sharp pinching frosts in the spring, that their flowers are not so double and fair as those planted a little later, yet, if they can preserve the green leaves of the plants from being injured, the roots greatly increase in bulk. But in gardens where these flowers are preserved with care there is always provision made to cover them from the injuries of the weather, by arching the beds over with hoops or frames of wood, and covering them with gar-

den mats or cloths in frosty nights, especially in the spring of the year, when their buds begin to appear: otherwise, if the best and most double flowers be planted, the black frosts and cutting winds in March will often cause them to blow single, by destroying the thrum that is in the middle of the flower;—a circumstance which has often occasioned persons who have bought the roots to think they were cheated, when it was wholly owing to their neglect of covering them.

But, besides this mode, these roots may be planted in borders, clumps, and other places, with much success and effect, in mixture with other plants; in which method three, four, or more roots should be planted together in patches of the breadth of five or six inches, being properly varied in distance and situation. And whether planted in beds or the borders a showery season should be chosen for the purpose, as in dry weather they are apt to become diseased,—proper care being taken to manage the distribution of the colours in such a way as to produce an agreeable variety. They may likewise be planted in pots, where the varieties are curious and valuable, three or more roots being put into each; and by being protected by frames, a green- or hot-house during the winter season, they may be brought forward so as to flower very early and in great perfection.

In the wood sorts the propagation may be effected in the same manner as in the garden kinds; but the sooner the roots are taken up and divided after the decay of the leaves the better. The wild *Anemones* should be taken up when the leaves decline, and be planted out in proper situations.

In raising new varieties of these plants from seed, some of the best and most leafy single, or what are usually termed Poppy *Anemones*, should be provided, and planted out early that they may grow vigorously and afford good seed, which should be carefully collected a few weeks after their flowering is finished. Some, however, procure the seed from the shops. The best time of sowing is probably in August; but some advise the spring, as in March or the following month. This may be performed in boxes, pots, or broad earthen pans, where a small supply of roots only is wanted; but where the demand is great, it is best sown on beds prepared for the purpose. The proper soil or earth for this use is that of the light sandy kind. The seed should be sown as evenly as possible, but rather thick, and be covered by sifting light mould over it to the depth of about a quarter of an inch. The only attention necessary afterwards is that of occasionally shading the plants from

the effects of the sun in hot weather, and giving them a gentle watering now and then. In about six weeks the plants will show themselves, when they should be kept perfectly free from weeds till the leaves begin to decay, when a covering of light sifted mould should be again applied, and another in the autumn may sometimes be required. During the winter they should be well protected from the frosts. In the second summer many of the plants will flower, and the best may be marked by a stick; but none should be destroyed till the third year. At this period the roots will begin to be too thick, and at the decay of the leaves must of course be taken up, which is best done by passing the mould through a fine sieve. And as when sown in beds many roots will be unavoidably left, they should be levelled, and suffered to remain till the following year. The roots that have been separated should be preserved, as before directed, for future planting.

These are all highly ornamental plants, capable of being employed with much effect in pleasure-grounds: many of them are hardy, flower early, and produce great variety in such situations. The wood sorts are very useful in adorning wilderness quarters. The double sorts, when in beds, afford much beauty and variety.

In the *pulsatilla* kinds the propagation may be accomplished either by the seed or dividing the roots. In the first method the seeds should be sown in boxes or pots filled with very light sandy earth, and not covered too deep with mould, which will prevent their rising, as they require no more than just to be covered. The boxes should be placed where they may have the advantage of the morning sun, but be screened from it in the heat of the day; and when the season is dry the earth be refreshed occasionally with water. The best time for sowing is in July or August, soon after the seed is ripened; as by keeping its vegetative power is apt to be destroyed. The boxes or pots should remain in such shady situations until the beginning of October, when they may be moved so as to enjoy the full sun during the winter season. In March, when the plants begin to appear, they should be again removed so as to have only the forenoon sun; for if they are too much exposed to heat the young plants are soon destroyed. They should be refreshed occasionally with water in dry weather, and be carefully kept clean from weeds.

When the leaves are entirely decayed, the roots should be taken up in the manner directed above; and as there will be many small roots left, the earth should either be returned into the boxes again, or spread upon a bed of light earth,

to see what plants may rise the succeeding year. The roots after being thus taken up should be immediately replanted in beds of light fresh sandy earth, about three or four inches asunder; covering them about three inches thick with the same light earth. The spring following most of the plants will produce flowers, but not so large or fair as in the succeeding years. As the roots of these plants are fleshy, and generally run down deep, they will not bear to be kept long out of the ground; therefore, when they are removed, it should be done early in the autumn, that they may take fresh root before the frost sets in.

In this mode of propagation the plants thrive best in loamy soil; as in very light dry ground they are apt to be destroyed by too much heat.

These are plants that afford variety in the borders of pleasure-grounds, especially the first species and its varieties, which are hardy, succeeding in almost any situation.

In the *hepatica* kind the propagation may be effected in the single sorts either by the seed or the parting of the roots; but in the double it can only be done by the latter method. The seed of the single flowers frequently, however, produces double ones. New varieties are likewise raised in the former manner.

In the first method the most proper season for sowing the seeds is in the beginning of August, either in pots or boxes of light earth, which should be placed so as to have only the morning sun until October, when they should be removed into the full sun to remain during the winter season: but in March, when the young plants begin to appear, they must be removed again to a shady situation, and in dry weather be frequently watered; when about the beginning of August they will be fit to be transplanted: at which time prepare a border of good fresh loamy earth, with an eastern aspect; into which remove the plants, placing them about six inches distance each way, closing the earth pretty well to their roots to prevent the worms from drawing them out of the ground. In the spring following they begin to show their flowers; but it is three years before they flower strong, till which time their goodness cannot be ascertained: when if any double flowers, or such as are of a different colour from the common sorts, be found, they should be taken up and planted in the borders, where they should continue at least two years before they are taken up or parted; as it is remarkable in these plants, that where they are often removed and parted they are very apt to die; but when they are permitted to remain some years undisturbed, they grow

rapidly, and become large roots. In propagating them by roots they should not therefore be often parted, or into too small parts.

Double-flowered plants, as they never produce seeds, are only capable of being propagated by parting their roots, which should be done in March, when they are in flower, care being taken not to separate them into very small heads. They should not be parted oftener than every third or fourth year, as they never thrive or blow well where this is the case.

These are plants that display much beauty, affording flowers very early in the beginning of the year. The double sorts are the most ornamental, as the flowers in them are much larger, and continue in blow much longer. These should therefore be placed in the most conspicuous situations in the borders or clumps of pleasure-grounds; but the single kinds deserve places for the sake of variety.

ANETHUM, a genus comprehending different herbaceous annual and perennial plants of the Dill or Fennel kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx has an umbel, universal and partial manifold: the involucre neither universal nor partial: the perianth proper obsolete: the corolla universal and uniform; floscules all fertile, proper, five petals, involute, entire, and very short: the stamina have capillary filaments and roundish anthers: the pistillum is a germ inferior: the styles approximating, obsolete: the stigmas obtuse; no pericarpium: the fruit subovate, compressed, striated and bipartite: the seeds are two, subovate, margined, convex, and striated on one side, flat on the other.

The species cultivated are: 1. *A. graveolens*, Common Dill; 2. *A. fœniculum*, Fennel.

In the first there is much resemblance to Fennel; but it differs from it in having an annual root, a smaller and lower stem, seldom exceeding threequarters of a yard: the leaves being more glaucous, and of a less pleasant smell: the seeds broader, flatter, surrounded with a membranaceous rim, and of a less pleasant flavour: the umbels of flowers yellow, but smaller than those of Fennel. It has a peculiar strong aromatic smell. It is an annual plant.

The second species rises in height from three to five or six feet: the stem is upright and very smooth: the leaves finely cut; leaflets capillary: the umbels very large and hollow: the corollas yellow; petals equal: the fruit ovate-oblong: the seeds have five ribs on the back, but no mem-

brane round the edge as in the Dill. It is a native of Germany. It flowers in July, and the seeds ripen in autumn.

There are several varieties of this plant, Linnæus mentions four; but Miller has only the three following: Common Fennel; Sweet Fennel, and Azorean Fennel, or Finocchio. The first variety has a strong fleshy root, which penetrates deep into the ground, and will continue several years. It flowers in July, and the seeds ripen in autumn.

In the second variety the leaves are very long and slender, growing more sparsely, and do not end in so many points as those of the first sort. The stalks do not rise so high, and the seeds are longer, narrower, and of a lighter colour. Though supposed a variety by some, others have found it always retain its differences under cultivation. The third variety has very short stalks, which swell out just above the surface of the ground, to four or five inches in breadth, and nearly two in thickness, the part being fleshy and tender, so as to be eaten when blanched and prepared as a cold salad.

If the plants be allowed to run up for seeds, the stems seldom rise higher than a foot and a half in height, having a large spreading umbel on the top. The seeds are narrow, crooked, and of a bright yellow colour: they are very sweet, and have a strong Aniseed smell.

Culture.—The propagation of these plants is easily effected by the seed; which in the Dill and Finocchio must be sown annually, as they only endure one summer. A little space of ground is sufficient for the supply of a family of any of these plants; but particularly the Fennel, as it lasts several years. They will succeed in almost any soil or exposure.

In the *Dill*, the cultivation may be either in shallow drills, at eight or ten inches asunder, or broad-cast over the surface, the plants being afterwards set out by the hoe to proper distances, as eight or ten inches. The seeds may be sown either in the autumn or spring; but the former is the best season, as they succeed the best, and grow with the greatest vigour. They require no trouble while growing, only to be thinned as above, and kept clear from weeds. The first thinning may be performed in May, when they are advanced a few inches in height.

When the seeds begin to be formed, which is mostly about the latter end of July, the umbels should be gathered for the purpose of being used in pickles, with cucumbers, &c. Where the seeds are wanted they must stand till fully ripened.

In the *Fennel* the culture may either be in drills at eighteen or twenty inches apart, or by

sowing the seed broadcast, and setting them out afterwards to twelve or eighteen inches distance each way. The best season for sowing is the autumn. The plants will furnish plenty of leaves for use the first year, but more abundantly the second, and continue for several seasons afterwards by cutting down and clearing away the old stems every autumn. The young plants of this sort may likewise be transplanted into beds in the summer or autumn, as occasion may require; and they may also be increased by slips from the roots; but this is not so good a way as by seeds.

In the cultivating of *Finochio*, care should be taken to procure good seeds, which for the first crop should be sown in March; and occasionally for successions till July. These sowings should be performed in drills at the distance of two feet from each other, set out by means of a line, the seeds being scattered in and covered with fine earth to the depth of half an inch. When the plants are risen to the height of a few inches the weeds should be hoed out, and the plants afterwards occasionally thinned to the distance of eight or ten inches. In this way there will be sufficient room for the bases of the stems to swell out in. After the stems have begun to swell out and distend themselves, they should be carefully earthed up when perfectly dry, on both sides, in order that the bulbous parts may be blanched and rendered tender, which is mostly effected in the course of a fortnight or three weeks. The late or autumn crop should be protected from the frosts by being covered with peas-halm, or any similar covering.

A light rich soil is the most suitable for this plant.

A small bed of this sort of plants will be sufficient for a family.

ANGELICA, a genus comprising several herbaceous perennial plants of large growth.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellales*.

The characters are: that the calyx is an universal umbel, manifold and roundish, partial, and when flowering exactly globular: the involucre universal, three or five-leaved and small, partial, eight-leaved and small: the perianthium proper, five-toothed, and scarcely observable: the corolla universal and uniform: the floscules all fertile, partial, having five equal petals, lanceolate, flattish, incurved and caducous: the stamina consisting of simple filaments longer than the corolla: the anthers simple: the pistillum an inferior germ: the style reflex: the stigmas obtuse; no pericarpium: the fruit

roundish, angular, solid, and bipartite: the seeds two, ovate, flat on one side and margined, convex on the other and scored with three lines.

The species of most importance are: 1. *A. archangelica*, Garden Angelica; 2. *A. lucida*, Shining Angelica; 3. *A. atro-purpurea*, Purple Angelica.

In the first the root is thick, branched, and very long, being brown on the outside and white within: the leaves pinnate, with the extreme leaflet three-lobed; universal umbel copious, rays sixty, angular, partial globular; involucre frequently one-leaved; involuclles many-leaved, ten, linear, reflex: the petals ovate, acute, greenish or pale purple, caducous: the filaments white: the fruit elliptic, swelling, lens-shaped, slightly emarginate at both ends, grooved and winged, whitish or pale straw-colour, splitting into two seeds, which are convex on one side, with a stiff marginal wing, and three on the back similar to it; flat on the other side, with a single raised longitudinal streak. It is a native of the northern parts of Europe, and flowers with us from June to August.

The second species has the whole plant smooth: the root biennial: the stem from a foot to two feet in height, the thickness of a finger at least, round, sometimes straight, sometimes flexuose, branched, hollow, striated especially towards the top: the leaves bipinnate, rising from a large, striated sheath: the root-leaves tripinnate: the leaflets lanceolate or ovate, the outmost confluent with the next pair: the umbels and umbellules convex and close; rays striated; universal involucre of about five narrow-lanceolate, mucronate leaflets: the leaflets of the partial involucre are about as many as there are outer rays of the umbellule; they are subulate and acuminate: the petals of a dirty whitish or very pale yellow colour: the anthers twin and yellowish; seeds brown, of a hot aromatic flavour, with little smell. It flowers in June, and the seeds ripen in August. It is a native of Canada.

In the third species the stem is six feet high, fistulous and jointed, polished, and of a dark purple, with a glaucous bloom: the common petioles sheathing, streaked, partial compressed and channelled: the leaflets oblong and sublobate, with the serratures white at the tip, veined, naked, pale underneath, and mostly sessile: the umbels three, terminal; sheaths two, opposite, purple and leafy at the top; common peduncle round, partial angular, or furrowed; proper polished: it has no involucre. Involuclles with twelve subulate leaflets, the length of the um-

bellule, which is hemispherical: the petals incurved, shorter than the stamens, ferruginous without, purple within: the receptacle and stamens green: the seeds convex and three-keeled. It is a native of North America.

Culture.—The propagation in all the sorts may be easily effected by means of the seeds. The first sort succeeds the best in such soils as incline to moisture. The proper time of sowing is in the autumn, soon after the seeds have become perfectly ripe, as when sown in the spring they seldom answer well, the vegetative power being much destroyed. The sowing is usually performed in the broadcast method, being afterwards well raked in. When the plants have attained the growth of six or seven inches in height, they are in a proper state to be transplanted, which should be done to a considerable distance, as twenty inches or two feet or more. They grow well on the banks of ponds.

In the first year after planting leaves are only produced; but in the second they run up to stem, flower, and perfect their seed. If it be the intention to continue the plant, the stems must be cut down in the spring, by which they may be perpetuated for three or four years. Where the object is seed, new plantations must be annually made, as in seeding the plants are only biennial.

A plant or two may be proper in pleasure-grounds, for the sake of variety.

ANGELICA-TREE. See ARALIA.

ANISEED TREE. See ILLIRIUM.

ANNONA, a genus comprehending plants of the deciduous and evergreen tree, and shrubby kinds. The Guanabus, or Custard-apple, and Papaw-tree.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Coadunatie*.

The characters are: that the calyx is a three-leaved small perianthium: the leaflet cordate, concave and acuminate: the corolla consists of six petals, cordate and sessile: the three alternate interior ones less: the stamina have scarcely any filaments: the anthers are very numerous, placed on the receptacle: the pistillum is a roundish germ, placed on a roundish receptacle; no styles: the stigmas obtuse and numerous, covering the whole germ: the pericarpium is a very large, roundish, one-celled berry, clothed with a scaly bark, or a compound berry: the seeds very many, hard and ovate-oblong, being placed in a ring, nestling.

The species of most importance are: 1. *A. reticulata*, Netted Custard-Apple; 2. *A. muricata*, Rough-fruited Custard Apple, or Sour Sop; 3. *A. squamosa*, Undulated Custard-

Apple, or Sweet Sop; 4. *A. tripetala*, Broad-leaved Custard Apple; 5. *A. palustris*, Shining-leaved Annona, or Water-Apple; 6. *A. triloba*, Three-fruited Annona, or Papaw-Tree; 7. *A. Asiatica*, Asiatic Custard-Apple.

The first is a tree which grows to the height of twenty-five feet or more, with spreading branches: the bark is smooth and of an ash colour: the leaves are of a light green colour, and have several deep transverse ribs, ending in acute points: they are alternate in two rows, elongate, broad, rounded at the base, acuminate with a blunted tip, entire about the edge, veined, smooth on both sides: the petioles gibbous, short, excavated and smooth: the flowers three or four close together, peduncled, nodding, whitish, the same size as in the third: the petals three, linear, thick, three-cornered, blunt, unequal and brown on the outside, yellowish white within, spotted with dark purple, excavated at the base: the nectary consists of three very minute, oblong, blunt petals, at the base of the genuine petals: the body of the stamens and pistils is roundish, minute and whitish: the fruit is roundish, heart-shaped, the rind sometimes reticulate, thick, brown, shining. It is of a conical form, according to Miller, and as large as a tennis-ball, of an orange colour when ripe, having a soft, sweet, yellowish pulp, the consistence of a custard, whence the name. It is a native of both the East and West Indies.

The second species is a middle-sized tree, rarely above twelve or fourteen, or at most twenty feet high: trunk upright, with stiff, round, smooth branches, and a brownish ash-coloured bark; leaves petioled, alternate, sparse, oblong, acuminate, entire, shining, firm and stiffish: the petioles short: the peduncles axillary, solitary, thick, longer than the petioles, one-flowered: the flowers coriaceous and yellow: the calyx one-leaved and triangular: the corolla three-petalled: the petals acuminate, thick, concave, coriaceous, smooth, scabrous on the outside, and pale green: the nectary three-leaved: the leaflets alternate with the petals, only half the size, subcordate, smooth, convex and yellow: the filaments scarcely any: the anthers rather pedicelled, subclavate, bivalve and whitish: the styles very short, and crowded together into a conical form: the stigmas oblique and hirsute after flowering-time: the berry difform, cordate-oblong, muricate with prickles bowed back and fleshy: the seeds oblong, black, with a lateral scar of a different colour, and placed in a ring. It produces a large succulent fruit. It is a native of the West Indies.

The third species is a small tree, about eight

feet in height, and is frequently rather a shrub: the trunk is smooth, and the branches spreading and round: the leaves alternate, acuminate, entire, nerved, smooth on both sides, glaucous on the back: the petioles short, round, smooth, thickened at the base: the flowers peduncled, usually in pairs, oblong, acuminate, green without and whitish within: the peduncles below the petioles, longer and one-flowered: the calyx one-leaved and triangular: the petals three, lanceolate, triquetrous, plane-convex without, sharp at the tip, excavated within at the base, dark purple, smooth: the nectary none: the filaments scarcely any: the anthers imbricate, pressed close to the germ, obtuse and two-valved: the styles short, thick and imbricate: the stigmas oblong and oblique: the berry oval: the scales adnate, roundish, blueish, resembling subimbricate teats: the seeds flattened a little, black with a white scar on the side, wrapped in a succulent cottony substance. It is a native of both the East and West Indies. The fruit is sweet, and eaten in those countries.

The fourth sort grows to a very large tree in South America, and is well furnished with branches: the leaves are bright green, much larger than those of any other species: the fruit is oblong, scaly on the outside, and of a dark purple colour when ripe: the flesh is soft and sweet, and has many brown seeds intermixed with it, which are very smooth and shining. It is esteemed by the Peruvians as one of their most delicate fruits.

The fifth species is a small tree, only a fathom in height, or little more: the branches round, scabrous, ash-coloured: the twigs smooth, alternate and patulous: the bark tenacious, and may be drawn out into long threads for making ropes: the leaves are petioled, alternate, spreading, ovate, scarcely acuminate, entire, beautifully nerved, very smooth, coriaceous, and a little recurved: the flowers peduncled, towards the ends of the branches: the peduncle solitary, the length of the petioles, round, one-flowered, below the petiole, smooth: the flower yellow, the same size as in the second: the calyx three-parted, almost triangular: the petals three, concave, roundish with a short point, thick, coriaceous, veined on the outside, smooth and paler on the inside, with blood-red spots at the base: the nectary consists of three petals, shorter by half than the three others, narrower, acute, concave, white without, dark blood-red within: the filaments crowded, fixed to the receptacle below the pistil: the anthers oblong, angular, blunt and white: the germs crowded into a convex, green body: the styles scarcely any: the stigmas blunt, pale: the berry heart-shaped,

very smooth, with a coriaceous, pulpy rind. It is native of Jamaica. It is known by the name of *Alligator Apple*, and, from the softness of the wood, *Cork-wood*.

The sixth has the trunk seldom bigger than the small of a man's leg, and rises about ten or twelve feet high, having a smooth, greenish-brown bark. In March, when the leaves begin to sprout, its blossoms begin to appear, consisting each of six greenish-white petals. The fruit grows in clusters of three, and sometimes four together: they are at first green, and when ripe yellow, covered with a thin smooth skin, which contains a yellow pulp, of a sweet luscious taste; in the middle of which lie in two rows, twelve seeds, divided by so many thin membranes. All parts of the tree have a rank, if not a fetid smell. It is observed by Miller that this is rather a shrub than a tree, and that the flowers in this country are of a rusty purple colour.

The seventh is a middle-sized tree, with spreading branches: the leaves quite entire, alternate, petioled: the flower pale, single on binate peduncles: the petals three, oblong-conical, incurved and erect: the germs superior, uniting, as they ripen, into an oblong-conical berry, five inches long, red and smooth on the outside, filled with a whitish, sweet, eatable pulp, but inferior in flavour to the third sort. It is a native of the East Indies.

Culture.—All these plants are capable of being raised from seeds. In the more hardy kind, as the sixth species, the culture may be effected by seeds procured from North America, which should be sown in the autumn in pots of light rich earth, and sheltered during the winter season by means of a green-house for two or three years, when the plants may be turned out of the pots, and placed in the open ground in warm screened situations in the spring, for the purpose of remaining. As the seed of this sort is very slow in vegetating, if the plants do not appear the first year, the mould in the pots should not be disturbed, for they frequently come up afterwards. Their vegetation, however, proceeds much quicker when the pots are protected in the house in the winter season, and plunged in a gentle hot-bed in the early spring.

In the tender sorts the propagation is best effected by sowing the seeds in pots of rich light mould in the autumn, and placing them in a bark hot-bed under glasses about February. When the plants are risen to the height of three or four inches they should be pricked out into other separate pots, a little water given them, and then plunged into the bark bed, being after-

wards placed in some part of the stove where they must constantly remain. They should then be carefully managed, and have plenty of air admitted, as without this they are apt to become sickly. When the plants become large they must be shifted into pots of greater sizes; but care should be taken not to overpot them, being still kept in the bark heat. The heat should be kept up to that of the Anana, as marked on botanical thermometers. And the tan in the beds should be frequently turned over and refreshed. They should also have water frequently in summer in small quantities; but in winter more sparingly, a little once a week in mild weather, and once in a fortnight or more when frosty, may be sufficient.

The hardy sort casts its leaves in winter; but those of the tender kinds retain them, their chief beauty in this climate depending upon their green foliage, as they but seldom flower or produce fruit. The fruit in the hardy sort is different from that in the tender kinds, two or three growing together at the foot-stalks of the leaves.

The hardy sort is highly ornamental in the pleasure-ground, and the tender kinds in the stove.

ANNUAL PLANTS. Such plants as are of one year's growth and duration, continuing for the summer season, or only a few months. In general, however, all such plants as rise from seed sown in the spring, arrive at maturity in the summer or autumn following, producing flowers and ripe seed, and which afterwards perish in their tops, stems, and roots, are considered as annuals. The last effect takes place in most sorts in the autumn and winter following; though some hardy kinds, when late sown, are capable of standing over the winter until the ensuing spring, especially those of the esculent sorts; but very few of the flowering kinds remain longer than October or November, unless protected by a green-house, garden-frame, or some covering of that nature.

Plants of this tribe are numerous, as most of those of the herbaceous kind, consisting of uncultivated plants, weeds, &c., and also a number of cultivated garden and field plants, both of the esculent and flowery ornamental sorts belong to it. The latter kind are often simply termed annuals. They are likewise very extensive, and of various kinds, some of which, from the peculiarity of their nature, and others from their producing beautiful flowers, are cultivated for the purpose of ornament in flower-gardens and pleasure-grounds.

The annual flowering plants are distinguished

by gardeners into *hardy* and *tender* sorts: the former are such as can be raised from seeds sown on beds, borders, or other places, in the natural or open ground; the latter, such as constantly require to be sown on, and have in some degree the aid of, hot-beds, to promote their perfect growth.

Hardy Annuals.—These constitute a numerous assortment of flowering plants, fit for being cultivated in the natural ground. The following are some of the principal of them: *Adonis*, or Adonis Flower.—*Alkekengi*, white-flowered, blue, yellow-berried, red-berried.—*Amaranthus*, Prince's Feather, Love-lies-bleeding, purple.—*Alysson*, white, sweet-scented.—*Amethystea*, blue.—*Balm*, Maldivian.—*Belvedere*, or Summer Cypress.—*Calendula*, or Cape Marigold.—*Candy Tuft*, white-flowered, purple, large, white, crimson.—*Catch-fly*, Lobel's red-flowered, white, purple.—*Caterpillar*.—*Clary*, red-topped, white-topped.—*Convolvulus*, three-coloured minor, minor blue and white, minor blue, major blue, great white, great striped blue, great purple, red.—*Cyarus*, or Blue-bottle, blue-flowered, purple, white, red, striped blue and white.—*Cucumber*, sporting.—*Devil in a Bush*, blue-flowered, white, nettle-leaved.—*Fumatory*, yellow.—*Hawk-weed*, yellow, red.—*Hedge-Hog Trefoil*, snail-shaped, prickly, turbinated, globular, orbicular, long crooked-twisted.—*Honey-wort*, great, less.—*Holly-hock*, Chinese variegated, double-flowered.—*Jacobæa*, or Rag-wort, purple-flowered, white.—*Indian Corn*, tall-growing dwarf.—*Kidney-beans*, scarlet runner, dwarf scarlet, large white runner.—*Ketmia*, bladder.—*Larkspur*, upright blue, upright purple, upright white, upright rose-coloured, white rocket, rose rocket, dwarf rose rocket, dwarf white rocket, dwarf blue rocket, dwarf red rocket, branching, blue branching, white branching, double and single-flowered of all the different sorts.—*Lavatera*, Cretan red-flowered, white, purple.—*Lupine*, dwarf yellow, large yellow, white, great hairy blue, great hairy rose-coloured, narrow-leaved blue.—*Lychnis*, dwarf.—*Marigold*, double orange-coloured, double yellow, double lemon-coloured, gold-coloured, parti-coloured, yellow, ranunculus-flowered, childing, or profliferous, Cape Marigold.—*Mallow*, curled-leaved, oriental.—*Mignonette*, odoriferous or sweet-scented.—*Nasturtium* major, or large-growing, minor or dwarf.—*Nolana*, Peruvian dwarf blue.—*Nigella*, or Devil in a Bush.—*Pansey*, or Heart's Ease, common, small, variegated, large Dutch variegated, large purple, yellow, purple and yellow, purple, yellow, and white.—*Peas*, sweet-scented, purple, white, painted lady, scarlet,

Tangier.—*Pea*, winged, pea crown, white-blossomed crown, painted lady crown, rose-coloured.—*Persicaria*, oriental, red-flowered, white-flowered, poppy, large double purple, double red, white variegated, red and white spotted carnation, dwarf red, dwarf purple, dwarf variegated, double and single of all the different sorts.—*Queen's Balm*.—*Scabious*, purple, sweet, red-flowered, white-striped, hen-and-chicken-flowered, stony-flowered.—*Snail Trefoil*.—*Stock Gilliflower*, ten weeks, purple-flowered, red, white, scarlet, dwarf, French, wall-flower-leaved, white.—*Stock Virgin*, purple, white.—*Snap-Dragon*, annual, with white flowers, purple flowers, major or greater, with red flowers, purple, white, yellow, scarlet, red and white, purple and white, red and yellow, white and red, yellow and red, yellow and white, scarlet, gold-dotted.—*Strawberry Spinach*, sun-flower, annual, tall-growing dwarf, double-flowered of each sort.—*Sweet Sultan*, purple, red, white, yellow.—*Toad-flax*, three-leaved yellow, three-leaved purple, three-leaved blue, variegated, white, branching yellow, *Tobacco*, hardly round-leaved, Virginia long-leaved, Virginia broad-leaved.—*Virginia*, or *Virgin Stock*.—*Venus's Looking-glass*, purple, white.—*Venus's Navel-wort*, blue-flowered.—*Xeranthemum*, or *Eternal Flower*, red, white, purple, double-flowered.

The usual season for sowing all these sorts of plants is in the spring, from the middle or latter end of February to the middle or latter end of April, for the principal blow; and in May and the following month for successional and late flowering, especially those of the quick flowering kinds, which are of short duration.

The manner of sowing these sorts is principally in little patches or clumps. These patches should be formed from about three or four, to five, six, or eight inches in diameter, at moderate distances, and in some sort of regularity, towards the front, middle, and back parts of the borders or beds, and also in a varied manner in respect to the plants; the smaller growing sorts being constantly sown more or less towards the fronts of the borders, according to their degrees of growth, and the larger kinds more backwards in the same proportion. Some may likewise be occasionally sown in pots; in all of which, each sort and variety should be in separate patches, &c. from a quarter of an inch to half an inch or an inch in depth, or little more, according to the sizes of the different sorts of seeds; being careful to loosen and break the earth a little, so as to render it fine for each patch, especially if hard, stubborn, or cloddy; then drawing off a little depth of mould,

according to circumstances, to one side, sow the seeds many or few together in the patches, proportionately to the sizes of the plants, covering them regularly with the earth drawn aside to the depth required; and proceed in this manner, always placing a small short stick or some other mark to each patch as the sowing is performed, in order to distinguish the places in which they have been put in. Some may also be occasionally sown in drills, either in beds separately, or in the borders.

After sowing, if it be dry warm weather, it will be beneficial to give occasional light waterings, both before and after the plants are come up, especially during their more early growth. And when they are come up about an inch or two in height, those in the patches will, in many of the large tall sorts, require thinning.

In the advancing growth of the plants, the principal culture necessary is to keep them clean from weeds; and where any large sorts remain too close, or crowded together, to thin them according to their growth; and in the larger tall-growing kinds, to support them with sticks, as also most of the climbing or trailing sorts.

If it be required to have any desirable sorts of these annuals of moderate growth to flower early, they may be forwarded by sowing the seeds in pots in February or March, and placing them in a hot-bed, or more successfully in a hot-house, &c.

As all the plants of this tribe generally produce plenty of ripe seed in autumn, care should be taken to save proper supplies of the different best sorts, as they ripen in perfection, in order to have plenty for sowing the ensuing spring.

Tender Annuals.—This class comprises various tender curious flowering plants, mostly raised in hot-beds. The principal of them are contained in the following list:—*African Marigold*, orange-coloured, lemon-coloured, deep yellow, fistulous or quilled, waved-flowered, dwarf, sweet-scented, double-flowered of each sort.—*Amaranthus*, *greater or tree, *bloody-trailing, or love lies bleeding.—**Balsam*, red, scarlet, purple, striped, variegated, double.—**Basil*, common, greater, upright, sweet, with broad-leaves, fringed-leaved, purple-leaved, tricolor-leaved, red-flowered, purple-flowered, long-spiked, &c. least, or bush Basil, with hoary leaves, dark purple-leaved, variable-leaved, &c.—*Calendula*, or Cape Marigold.—**Capsicum*, long-podded, short-podded, heart-podded, bell-podded, angular-podded, cherry-podded, olive-podded, red-podded, scarlet-podded, yellow-podded.—*Chinaaster*, blue-flowered, purple, red, white, striped, variegated, bonnet-flowered, quilled-flowered, double and single of each sort.

—*Chinese Holly-hock*, variegated, double.—*Chrysanthemum*, yellow, white, cream-coloured, sulphur-coloured, fistular or quilled, double and single of each sort.—*Convolvulus*, major, with deep purple flowers, red, blue, white, deep blue.—*Cucumber*, snake-shaped.—**Egg Plant*, or *Melongen*a, white-fruited, purple-fruited.—*French Marigold*, deep yellow, golden yellow, crimson-coloured velvety, crimson and yellow-striped, variegated crimson and yellow, sweet-scented dwarf, double and single of each sort.—*Gourd*, orange, pear-shaped, striped pear-shaped, lemon top-shaped, bottle or calabash buckler-shaped squash, carbuncled, warted, long taper, long crooked, horn-shaped, large barrel-shaped, large globular, large oval, hemispherical, yellow, stone-coloured, flesh-coloured, sandy-coloured, parti-coloured, white, &c.—**Globe Amaranthus*, purple-headed, white, variegated, silver-spiked.—*Indian Corn*, tall-growing, dwarf.—*Indian Pink*, bright red, purple, white, red and white variegated, differently variegated, numerous, large imperial, double and single of each sort.—**Love-Apple*, red-fruited, yellow-fruited, cherry-shaped.—**Marvel of Peru*, red-flowered, yellow, white, purple, striped, long-tubed-flowered.—**Melon*, snake-shaped, serpent cucumber.—*Mignonette*, sweet-scented.—*Nolana*, trailing blue.—**Palma Christi*, major, or tall-growing, minor or lesser, most broad-leaved, lesser-leaved.—*Persicaria*, oriental, red-flowered, white.—*Sultan Flower*, yellow.—*Stock Gilliflower*, ten weeks, red, purple, white scarlet, dwarf scarlet, dwarf white, wall flower-leaved white, wall flower-leaved purple, double of each sort.—*Tobacco*, Virginia long-leaved, Virginia broad-leaved.—**Tree Amaranthus*.—**Zinnia*, red-flowered, yellow-flowered.

In respect to the culture of the more tender annuals, they should be either sown in a moderate hot-bed in March or April, and the young plants forwarded a little in growth therein till settled warm weather in the middle or latter end of May, and then transplanted out, or sown in a bed of natural earth, or warm border, in April, protected under a garden frame, or glasses, or at least defended in cold nights by garden mats; and in either method transplanted in May or beginning of June into beds, borders, pots, &c. in the flower and pleasure-garden, for flowering in summer and autumn. But where the convenience of a hot-bed is attainable, it is always advisable to raise a principal supply by that means for early transplanting and flowering, as portions of the different sorts may be sown and raised in the same hot-bed, making the bed or beds in March or the beginning of April, and

defending them with a frame and lights, hand-glasses, or other means, in cold nights and bad weather. A moderate hot-bed of about two feet thick in dung will in this case be sufficient, earthing it at top, five or six inches deep, with fine rich mould; in which sow the seeds in small drills crossways, drawn with the finger two or three inches asunder, from half an inch to an inch in depth, according to the size of the different sorts of seeds, which should be sown regularly, each sort separately, and covered in evenly with the earth the same depth, giving them air occasionally in the day-time; and, as they advance in growth, admitting gradually a larger portion to strengthen and harden them, occasionally giving also gentle waterings. Continue the care of the young plants in this manner until advanced two or three inches in growth, when it will be proper to prick out a quantity of the principal sorts into another moderate hot-bed, three, four, or five inches asunder, and others into natural beds of light earth, under frames and glasses, or to be defended occasionally by mats. They may however in general be pricked out in the middle or latter end of May into natural beds in the open ground; being watered at the time, and afterwards occasionally; and shaded with mats from the sun, if convenient, till the plants have taken fresh root; observing also to give those in the hot-beds and under glasses less or more air every mild day.

When in three, four, or five weeks, in either of these beds, they have acquired a tolerable degree of strength and size, as four, five, or six inches growth or more, according to the difference of the sorts, they should all be finally transplanted about the latter end of May and beginning of June into the open ground on the beds, borders, and other compartments, or into pots, to remain for flowering, taking the opportunity of moist weather, if possible, for the work. Where convenient, some sorts should be replanted, with a little ball of earth adhering about the roots, as it will be of great advantage in their more early flowering; watering them as soon as planted out, and afterwards as occasion may require till freshly rooted, and they discover signs of a renewal of growth.

Where any of the plants have remained in the seed-bed not pricked out, as they may probably have drawn one another up into a weakly growth, care should be taken to plant them out in May, as soon as the weather is settled and favourably temperate, especially the more tender kinds that are marked with an asterisk.

Ten-week Stocks and Mignonette may be sown in a hot-bed so early as February, or any time in March, in order to raise a few plants to

prick out into pots, three or four in each, for the earliest flowering; or some may be sown in March in the natural earth, or a warm border, under glasses, or other occasional shelter, for early transplanting in April or May into pots and flower-borders, &c.

In the gourd kinds, when designed to raise them in hot-beds, they should not be sown before April; for if sown earlier they are apt to grow too large before the season becomes sufficiently warm to admit of planting them out in the open ground; but in the beginning or middle of May, some may be sown in the natural ground, both for transplanting and in patches to remain.

But where hot-beds, frames, glasses, and other similar conveniences are not at hand, many of the species and varieties of this class, as has been seen, may be raised in the open ground, especially, if not generally sown till the beginning, or towards the middle or latter end of April, according to the state of the season, sowing them on a warm border, or other protected situation, in good light mould, or in pots of light earth in similar situations. In these cases, when the plants are properly advanced, they should be pricked out into beds, or planted out where they are to remain, in the latter end of May or beginning of June. These often flower in tolerable perfection, though not so early, or in so fine a manner as in the hot-bed method. In finally setting out the plants in May or the following month, much advantage is derived by performing the work in a moist season; and when balls of earth can be preserved round the roots, they will succeed the better in many of the sorts. The planting may be executed with a trowel or dibble, according to circumstances; and the larger sorts set out singly, and the whole in a diversified manner, according to their nature. In some of the smaller sorts, setting several together may be preferable, as producing a better effect when in flower: water should be given at the time of planting them out, and occasionally till they have taken fresh root. In the after culture they chiefly require to be kept clear from weeds, supported in their growth by proper sticks, and properly turned up in some of the sorts. The potted plants will require frequent watering in dry weather, when set out in their different situations.

Most of the plants of this tribe are in flower in June and July, frequently continuing till September or the following month, and are highly ornamental; but there are some that are curious for the appearance of their fruit.

As most of the kinds produce seeds in autumn, care should be taken to provide proper

supplies of such as is well ripened from the best flowering plants of the different kinds; which, when rendered perfectly dry, should be put up in bags for the purpose.

Tenderest Annuals.—The plants of this class are not so numerous as the above, but more ornamental and curious, and more tender in their nature; they are chiefly the following:—*Amaranthus*, tricolor, bicolor, maximus or tree amaranthus, bloody, &c.—*Balsamine* or *Balsam*, double-striped, double scarlet, double purple, double bizarre.—*Browallia*.—*Cock's Comb*, tall purple-headed, dwarf purple, crimson, buff-coloured, yellow, branching.—*Convulvulus*, scarlet.—*Egg Plant*.—*Globe Amaranthus*.—*Humble Plant*.—*Ice Plant*, or *Diamond Ficoides*, oval-leaved, pinnatifid-leaved.—*Marvel of Peru*.—*Martynia*, purple-flowered, red, white.—*Melon*, snake-shaped.—*Stramonium*, double, white, double purple, double striped.—*Sensitive Plant*, double-flowered annual, common shrubby, humble.—*Zinnia*, varieties of.

These very tender annuals must all be raised on hot-beds in the spring till May or June, under frames; and to obtain them in a tolerable degree of perfection, two different hot-beds, at three, four, or five weeks intervals, will be necessary for sowing and raising them in; one the latter end of February, or any time in March, but not later than the beginning of April: the young plants, when about one, two, or three inches in height, being pricked out, some into small pots singly, others in the earth of the bed, three or four inches asunder, the whole being in the same bed if there be room enough, if not into another hot-bed; and when they have advanced in growth, so as to crowd one another, they should be removed into another hot-bed, under a deeper frame, or the frame raised at bottom occasionally, as the plants rise in height. Some should be put into large pots, and others potted that were not so before, plunging the pots in the earth of the bed; or some may be put in the bed, six or eight inches asunder; water is then to be given, in general, and the glasses put on. The whole from their first growth must have an admission of fresh air every day by raising the upper end of the glasses one, two, or three inches, supplying them with moderate waterings. In this way they may be forwarded until the latter end of May or some time in June, according to their growth, or the temperature of the season, as before suggested; but in the mean time, in their advancing state, inure or harden them by degrees to the weather, particularly by gradually admitting a larger share of air, or by sometimes taking the glasses off entirely in warm days, &c.

The humble and sensitive plants should, in general, be continued constantly under glasses in a green-house, &c. or in a room window within, in the full sun, as, if fully exposed to the open air, it would deprive them of much of their lively sensitive motion; in which curious singularity, as has been observed, their principal merit consists.

But in order to raise some of the more curious sorts of this kind of annuals in the greatest perfection, it will be necessary to have three different successional hot-beds under frames and glasses, at a month's interval; that is, a small one in March, to sow the seeds and raise the plants on an inch or two high; a second in April of larger dimensions, in which to prick out the young plants from the seed-bed, three, four, five, or six inches asunder; and a third in May, for a larger frame to receive them when transplanted in pots, to remain till June, and they grow to the full size. While they are in the second and last hot-beds, the frames should be occasionally raised or augmented in depth, according as the plants rise in height.

The first hot-bed for the seed should be made, as already directed, of suitable dimensions, and about two feet and a half deep in dung; the frame and glasses then put on, leaving one end of them open, to let out the rank steam of the dung; and in a few days, or when the first great steam and heat of the bed is gone off, the earth, which must be rich, light, and dry, should be put on, four or five inches thick. The seeds of different sorts may now be sown, each kind separately, in small shallow drills, drawn with the finger, covering them with fine mould, from a quarter to half an inch deep, or with the very small seeds but very thinly. The glasses are then to be put on again, setting one end of them a little open, for the evaporation of the rising steam of the bed, covering them every night with garden mats. The plants mostly appear in a few days, when fresh air must be judiciously and with caution admitted, by propping up the ends of the glasses about an inch or two every mild day; and when the earth becomes dry, a very slight sprinkling of water should be given in a sunny forenoon. The glasses should mostly be kept close in the nights; but if a strong steam and heat take place, they may be raised a little at one corner, for air to enter, and the steam to pass away, hanging the end of a mat over the tilted part, and continuing to cover the glasses with mats every night.

The care of the seedling plants is to be continued in this manner in the beds for about three weeks, or till they are advanced one, two, or

three inches in growth, according to the different sorts; they are then to be pricked out into another new-made hot-bed.

This hot-bed should be put in readiness to receive them, making it for a two- or three-light frame, according to the quantity of plants that are ready for the purpose. When the bed has imparted a proper degree of warmth to the earth, take up the plants with care, and in the same manner as directed above, pricking them out into this, four or five inches distant, then giving them a very light watering, and occasionally shading them in the middle of sunny days till they have struck fresh root; and admitting air as before every fine day, by raising the upper ends of the glasses one or two inches; also occasional light waterings two or three times a week in warm weather, and defending them in the nights with mats, raising the frames, according as they extend in height, as before advised. After having had four or five weeks growth in this bed, if they have advanced considerably, so as to meet and crowd one another much, it will be advisable, as already noticed, to remove them into a third and final hot-bed, where it can be conveniently obtained; some being planted in the bed, others previously potted and then placed in it, to be covered by glasses, as directed above.

The frames, glasses, or other conveniences for these uses, should be sufficiently large, especially for the tall plants, and capable of being raised at pleasure as they advance in growth. The other management being the same as directed above. (See *Hot-bed*.)

ANTHEMIS, a genus furnishing several species of annual and perennial plants of the herbaceous kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidæce*.

The general characters of which are: that it has a common, hemispherical calyx, consisting of numerous, linear, subequal scales: the corolla compound, with radiate florets in the disk, hermaphrodite and tubular; those in the radius female, and more than five: the former are funnel-shaped and five-toothed. In the hermaphrodite florets the filaments are five, capillary, very short, supporting cylindrical, tubular antheræ: the germen oblong: the style filiform: stigmas two, reflex: the seeds solitary: the receptacle chaffy; and convex.

The species of most importance for the purpose of garden culture are: 1. *A. nobilis*, Common or Sweet Chamomile; 2. *A. maritima*, Sea Chamomile; 3. *A. tomentosa*, Downy Chamomile.

mile; 4. *A. tinctoria*, Yellow Chamomile; 5. *A. pyrethrum*, Spanish Chamomile, or Pellitory of Spain.

In the first species the root is perennial: the stems trailing, and hairy: the leaves bipinnate, pinnae rather distant, pinnules sometimes with two or three clefts, pointed, hairy, grayish: the flowers solitary: the calyx hairy, with broad, shining, membranaceous edges: florets of the circumference somewhat elliptical, either entire, or with two or three teeth; those of the centre yellow. Abundant in Cornwall. It flowers in July and August.

In the second the stems are widely prostrate, smooth and purplish: the leaves pinnate, gashed, naked, sprinkled with hollow dots, towards the base more closely toothed, under the base with a transverse raised purplish line: the peduncles terminal, solitary, substriated, pubescent, thicker towards the top: the flowers have the smell of Feverfew. It is a native of France and Italy; and flowers in July and August.

In the third species the stems are a foot high, one-flowered, and the leaves tomentose-silky: the two outer divisions of the corolla larger than the others. It is a native of the coasts of Greece, Italy, &c.

In the fourth the stem is striated, slightly hairy, and much branched: the lower leaves pinnate; lower pinnae short, distant, and toothed; upper pinnatifid, the midrib broader than the pinnules, which are lanceolate, toothed, slightly hairy, green above, and glaucous underneath: the upper leaves pinnatifid; midrib broad; pinnae irregular, linear-lanceolate, toothed; uppermost leaves sometimes simply toothed, slightly hairy: long, naked, striated, slightly hairy peduncles terminate the stem and branches, each bearing one flower: the calyx imbricate with numerous scales; outer of various lengths, inner equal, lanceolate, hairy, with a green dorsal line, and white shining edges: florets all yellow, those of the radius broad, three-toothed; of the disk numerous, short. It is a native of Sweden.

In the fifth the stems are many, prostrate, usually one-flowered, seldom branching: the root perennial, thick, running down a foot or more into the ground, about as big as a man's finger, the colour of horse-radish, white within, of an acrid biting taste: the flower large, the florets of the ray purple on the outside. It is a native of the Levant, and the southern parts of Europe.

The sixth species is a low shrubby plant, having the leaves pinnatifid at the top: the peduncles elongate: the calyxes membranaceous,

with a barren ray. It is a native of the Cape of Good Hope; and flowers from April to June.

Culture.—The first sort, or Common Chamomile and its varieties, may be easily propagated by parting the roots, by offsets, by slips, and by cuttings of the extending branches. This may be done in the summer season; but the best time is in March or the following month. They may be planted in beds, a foot asunder, to afford room for their spreading.

The variety with double flowers has a good effect when set in the borders, in small bunches.

The other species are capable of being raised from the seeds by sowing them in the spring season, on beds of common mould. They should be afterwards transplanted when sufficiently strong into the situations where they are to remain. In the fourth sort this is advised by Martyn to be done on "large open borders, near shrubs, where they may have room to grow, for they require to be three feet distant from other plants. In large open spots they make a pretty variety from June to November, during which time they continue in flower. Some of the flowers are white, others sulphur-coloured, and others of a deep yellow. Those which come from the Levant are taller plants, and produce larger flowers; but in other particulars they are the same with the European." They are likewise all capable of being propagated by cuttings and slips from the branches in the summer season, in shady borders or other places. In any of these methods they must be transplanted, when sufficiently rooted, into the fronts of the clumps, borders, and other parts of shrubberies, and other parts of pleasure-grounds. In these situations they flower annually, and continue several years. The last species is too tender to withstand the effects of the open air without protection in the winter season.

ANTHERICUM, a genus including plants of the herbaceous flowery Spider-wort kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronarie*.

The characters are: that there is no calyx: the corolla consists of six, oblong, obtuse, very spreading petals: the stamina are subulate, erect filaments: the antheræ small, incumbent, and four-furrowed: the pistillum is a germ obscurely three-cornered: the style simple, and of the length of the stamina: the stigma obtuse, and three-cornered: the pericarpium an ovate, smooth, three-furrowed, three-celled,

and three-valved capsule: the seeds numerous and angular.

The species are numerous, but those that most deserve cultivation are: 1. *A. revolutum*, Curled-flowered Anthericum; 2. *A. ramosum*, Branching Anthericum; 3. *A. elatum*, Tall Anthericum; 4. *A. Liliago*, Grass-leaved Anthericum; 5. *A. Liliastrium*, Savoy Anthericum, or Spider-wort; 6. *A. frutescens*, Shrubby Anthericum; 7. *A. alooides*, Aloe-leaved Anthericum; 8. *A. asphodeloides*, Mock Asphodel, or Glaucous-leaved Anthericum.

In the first the roots are fleshy, and composed of tubers joined at the crown, like those of the Asphodel: the stalk rises near two feet high, and branches out on each side; each branch being terminated by a loose spike of flowers, which are white, and the petals are turned backward to their peduncle. And according to Murray, the root-leaves are numerous, only one-third of the height of the scape, subulate, channelled at the base, then keeled and flat, striated, an inch and half broad, and spreading: the scape four feet high, almost naked, round, smooth and oblique: the bractes five, gibbous at the base, pressed close, subulate, the lower ones larger like the leaves, the upper ones scaly and shrivelling: the corymb terminating, compressed, having six round, long, alternate branches, knotted where the flowers spring forth: the flowers alternate, solitary, or two sometimes three together, on small gray pedicels, thicker at the top, each supported by a little subulate bracte: the corolla inferior: the petals lanceolate-ovate, reflex, obtuse, concave at the tip, white, except towards the end on the outside, where they are brownish green: the filaments a little shorter than the corolla: anthers erect, oblong, revolute as they wither: the root similar to that of the *Haemanthus puniceus*. It is a native of the Cape of Good Hope.

In the second species the root is round, and the stalks rise about the same height as the former, sending out many lateral branches in like manner, which are terminated by loose spikes of flowers: the leaves are hard and grassy, none on the scape, which is loosely paniced, with one-flowered peduncles: the corollas white: the petals flat, and not turning back as in the former sort: the three outer petals narrower than the others, lanceolate and sessile: the three inner oval and petioled. In each angle of the germ a small melliferous pore. It is a native of Sweden, &c. The flowers watch from seven in the morning to three or four in the afternoon.

The third has the roots composed of many tubers, each about the size of a little finger at

top, and diminishing gradually to the size of a straw: the leaves from seven or eight, to nine or ten inches in length, and an inch and half broad in the middle, lessening gradually to both ends; they are smooth and glaucous: the flower-stem about two feet high, dividing into several branches, having a few narrow leaves, generally one at every division of the branch: the flowers form a loose spike, and are white. This plant has been lately recovered from seeds which were sent from the Cape to England and Holland. It usually blows in August and September.

In the fourth species the roots are numerous, round, and collected into a tuber crowned with bristles: the leaves from the root many, firm, a foot long, carinated and grassy: the scape erect, eighteen inches high, firm: the spike loose, ten-flowered, and the peduncles simple: the flower two inches wide; petals in two ranks: the inner widest, petiolate and pure white: the outer have a green line running along beneath. It is a native of Italy, &c.

The fifth species has the root fascicled, with fleshy fibres. It has the corolla of the white Lily: the leaves grassy, soft, broader than two lines, the radical ones very long: the scape a foot or eighteen inches high: the spike thin-set with spreading flowers, on simple peduncles: the stipules coloured, ovate-lanceolate: the corolla above an inch in diameter, gradually widening; petals tender and white; ovate, thin, lanceolate, with a reflex point, which is thicker and has a green dot: they are marked with lines, and sweet-scented: the stamens almost as long as the petals, with weak filaments. In France it is called St. Bruno's Lily.

There are two varieties of this, one with a flower-stalk more than a foot and half high, the other with the stems much the same: the flowers are much larger in the former, and there is a greater number upon each stalk than in the latter. It is a native of Switzerland and Savoy.

The sixth species differs from the seventh by rising into a stem and branches, by having the leaves greener, longer, and narrower, with a firmer pulp, and a viscid juice flowing copiously from them when cut, of a greenish yellow colour: the root is fibrous, and not only the stem, but even the branches put out fibres, which hang down, and when they reach the ground strike root. It is a native of the Cape of Good Hope, and was formerly known by the name of Onion-leaved Aloe.

The seventh has broad, flat, pulpy leaves, resembling those of some sorts of Aloe, and was formerly on that account called Aloe with flowers of Spiderwort. The leaves spread open, are broader and more translucent, soft and pulpy,

than the above, pouring out a limpid juice: the root is tuberous: the flowers are produced on loose spikes, like the former, but are shorter; they are yellow, and appear at different seasons. This species grows close to the ground, never rising with any stalk. It is a native of the Cape of Good Hope.

The eighth has the leaves scarcely striated, but rough at the edge; more gibbous at the back towards one side; they are long, narrow and pulpy, almost taper, but flattened on their upper side: the flowers are yellow, and grow on long loose spikes as the former; these appear at different seasons; those of the spring and summer are succeeded by seeds in great plenty, which ripen. It is a native of the Cape.

Culture.—These perennials are in general capable of being propagated by the roots, offsets and suckers; but as some of the species do not supply them in sufficiency, they may be raised from the seeds.

In the first method the best season for the purpose is in the latter end of summer and beginning of the autumn, in beds of light vegetable earth in warm open situations, free from the shade and droppings of trees. An eastern aspect, where the plants are properly shaded from the sun in the mid-day, is preferable for some of the sorts, as they keep longer in blow and beauty.

This is likewise the proper period of transplanting, as when the business is performed in the spring the plants seldom flower the same year. This should not be done oftener than once in about three years, where increase is intended; and in the execution of the work the roots should not be too much divided, as when that is the case they do not flower well.

In the second method, or that by sowing the seeds, the best season is probably the spring, though they may be sown in the autumn. A bed of good light vegetable mould is the best for the purpose, and the situation should be sheltered and warm. The plants soon appear, and when their leaves begin to decay in the autumn they should be taken up carefully, and transplanted out into another bed of the same sort of earth, at the distance of from nine inches to a foot from each other. When the winter season is severe they should be protected from the frost by a thin covering of tan or some other substance. In this situation they should continue for about twelve months, when they will in general be sufficiently strong for flowering. In the following autumn they must of course be taken up without injuring the fibres of the roots, and be planted out in the clumps, borders, or other places where they are to remain. As they are

apt to be destroyed by frost in the winter season, care should be taken to protect them as much as possible.

The Cape sorts are capable of being raised by seeds: but this is seldom necessary, as they multiply greatly by offsets and suckers; which may be taken off at the period mentioned above, and planted out in pots of good bog earth, a very small portion of water being given, as much is apt to rot and destroy the roots. As these are tender plants they require the constant protection of a green-house stove or frames during the winter season. In these situations they should be managed with great attention and care.

ANTHOLYZA, a genus comprising plants of the ornamental herbaceous perennial bulbous-rooted tribe. It is sometimes termed *Æthiopian Corn-flag*.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx is a two-valved alternate imbricate spatha: the corolla one irregular ringent petal, tubular below, widening gradually to a large compressed ringent mouth: the upper lip straight, slender, and very long and erect, with two short wings at the base: the under lip shorter and trifid: the stamina long slender filaments under the upper lip, and pointed antheræ: the pistillum a germ below the corolla: the style slender, and a trifid stigma: the pericarpium a trigonous capsule of three cells, and many triangular seeds.

The species principally cultivated are: 1. *A. ringens*, Narrow-leaved Scarlet Antholyza; 2. *A. plicata*, Plaited-leaved Antholyza; 3. *A. cunonia*, Scarlet-flowered Antholyza; 4. *A. Æthiopica*, Æthiopian Crimson Antholyza; 5. *A. meriana*, Red-flowered Antholyza; 6. *A. merianella*, Dwarf Antholyza.

The first has round, red, bulbous roots, from which arise several rough furrowed leaves, near a foot long, and half an inch broad; between these comes out the flower-stem immediately from the root, which rises two feet high, is hairy, and has several flowers coming out on each side: these are of one leaf, cut into six unequal parts at the top; one of these segments is stretched out much beyond the others, standing erect: the margins are waved, and closed together, wrapping up the three stamens: the flowers are of a red colour, and appear in June; the seeds ripen in September.

The second species differs from the first in its appearance, and especially in not having the stamens so long: the leaves are long, narrow, and deeply furrowed, lapping over each other:

the flower-stem rises to the height of eighteen inches, and the flowers are ringent.

The third has a compressed bulbous root, covered with a brown skin, and putting forth fibres with little bulbs at the end; from this arise several narrow sword-shaped leaves, about nine inches long, and a quarter of an inch broad in the middle, terminating in acute points; these have one longitudinal midrib which is prominent, and two longitudinal veins running parallel on each side: they are of a sea-green colour, and appear in autumn, growing in length all the winter; in the spring the stalk arises from between the leaves, is round, strong and jointed; at each joint is situated a single leaf, which almost embraces the stalk for near three inches from the base, being then separated by the curvature of the stalk, standing erect: the stalks rise near a foot and a half in height, and are generally curved two opposite ways; the upper part being terminated by a loose spike of flowers, coming out of large spathes, composed of two oblong concave leaves, terminating in acute points: these are at their first appearance imbricated, but as the stalk increases in length they are separated; from between these two leaves come out the flowers, each having a slender saffron-coloured tube near half an inch long, which is then enlarged where the petal is divided, and the upper segment is extended two inches in length, being arched over the stamens and style: this is narrow as far as to the extent of the wings, but above them is enlarged and spread open half an inch in length, and is concave, covering the anthers and stigmas, which are extended to that length; the two wings are also narrow at their base, but are enlarged upward in the same manner, ending in concave obtuse points, which are compressed together, and cover the stamens and style: the flower is of a beautiful scarlet colour, and appears about the latter end of April or beginning of May.

In the fourth species the corolla is tubulous and of a scarlet colour; upper lip very large, lanceolate; lower five-parted, the lobes lanceolate, short, three alternately very short: the leaves are long and of a deep green: the flower-stem is round and a foot in height: it flowers in May and June.

In the fifth the root is bulbous, compressed, and shaped like a kidney, covered with a fibrous brown skin: the leaves sword-shaped, about a foot long, and an inch broad, ending in points: the two sides have sharp edges, but the middle is thicker, and has a prominent mid-rib; they are of a dark green colour, and rise immediately from the root: the stalk comes out from the root between the leaves, and rises a foot and a

half high: the flowers are produced from the side, standing alternately at about an inch and a half distance from each other; they have each a spathe composed of two leaves which are joined at their base, where they are broad, but gradually lessen to their points: before the flowers appear, they are of the same green colour with the stalk, and are divided but a small part of their length, inclosing the flower, but are afterwards split almost to the bottom, and wither before the flowers decay, becoming dry round the seed-vessel: the tube of the flower is an inch and a half long, narrow at the base, and a little curved, the upper half swelling much larger: the rim is divided into six obtuse segments which spread open, and are nearly equal: the flower is of a copper red colour on the outside, but of a deeper red within; it has three stamens a little longer than the petal; they are incurved, and terminated by oblong anthers of a dark brown colour, which are fastened in the middle to the apex of the stamens, lying prostrate: the flowers appear in April or May, and the seeds ripen in July.

The sixth species has the root bulbous: the culm a foot and half high, polished and columnar: the leaves alternate, three or four, sheathing, sword-shaped, streaked, pubescent, beyond the sheaths short, rarely more than six inches long: the flower-stalk rises between the leaves, about nine inches in height: the flowers three, alternate, in the same row, sessile: the glumes bivalve and lanceolate: the corolla salver-shaped; the tube bent, purplish, longer than the border, which is six-parted and equal: the divisions ovate, acutish and yellow: the stamens rising, the length of the corolla: the anthers linear and incumbent: the style filiform: the stigmas three, filiform: the flowers are large and pale red.

Culture.—These plants are capable of being raised with success, either by means of the divided roots and off-sets, or the seeds. In the latter method the seeds should be sown soon after they are ripe, as when they are kept out of the ground till the following spring they often miscarry, or remain long in the ground before they vegetate. If they be sown in pots of light vegetable earth, and plunged into an old tan-bed which has lost its heat, and shaded in the middle of the day in hot weather, they mostly come up the following winter. They must of course be kept covered with glasses to screen them from cold, otherwise the young plants will be destroyed. These should remain in the pots two years, if the plants be not too close, by which time they will have attained sufficient strength to be planted out into separate small pots filled with light vegetable earth.

The best time of transplanting these roots is in July or August, when their leaves begin to decay. In summer the pots should be placed in the open air, but in winter removed, and placed under hot-bed frames, as they are not very tender : where damp exists the leaves are apt to become mouldy. The roots send forth shoots in autumn, the flowers begin to appear in May, and the seeds ripen in August. When the third sort is raised in this way the seeds should be sown in pots about the middle of August, and placed in situations where they may enjoy the morning sun, being gently watered in dry weather. In September the pots may be removed to a warmer situation, and in the following month placed under a frame, to be protected from frost and hard rains, but in mild weather exposed to the free air. The plants appear in October, and continue growing all the winter : their leaves decay in June, when the roots may be taken up and planted out in pots.

In the latter mode, or that by means of offsets, which is mostly practised with the third, fifth, and sixth species, the best season of planting out the roots is in the latter end of summer or beginning of autumn. In the third species the method recommended by the Editor of Miller's Dictionary is to plant the roots out "in pots filled with light earth, to remain in the open air till October, when they must be removed into shelter, either into an airy glass-case, or placed under a hot-bed frame, where the leaves keep growing all winter, and in the spring the stalks arise and flower. During the winter season the plants require a little water when the weather is mild, once a week, but it must not be given in great quantities, especially in cold weather : in the spring they should be watered oftener ; and when the flowers are past the pots should be removed into the open air to perfect their seeds, which will ripen the latter end of June, soon after which the stalks decay to the root. When the stalks are decayed, the roots may be taken out of the ground, and kept in a dry room till the beginning of autumn, when they should be replanted."

The roots of the fifth and sixth sorts are directed to be planted, when the leaves are decayed, in separate pots filled with light fresh earth, and placed in the open air till toward the end of September, when the leaves begin to appear above ground, at which time remove them into shelter, as the plants require protection from the frost : they should not, however, be treated in too tender a manner. The best method is probably that of plunging the pots in an old bark-bed that has lost its heat in the beginning of autumn, covering it with glasses, which should be

drawn off daily in mild weather to admit free air. About March or April, when the flower-stems begin to shoot, they should be removed to a glass-case or good green-house to stand for flowering, after which free air should be admitted to perfect the seed. Two or three small roots may be planted in a pot, according to the size, and have the same management as the large ones the first season, and in the second have separate pots.

Some of these plants are highly ornamental, but from their tender nature require the protection of the stove or green-house.

ANTHOSPERMUM, a genus comprising plants of the shrubby green-house Amber Tree kind.

It belongs to the class and order *Polygamia Diœcia*, and ranks in the natural order of *Stelatae*.

The characters are : that the male calyx is a one-leafed conical perianthium, quadrifid beyond the middle : the divisions ovate-oblong, evolute, obtuse, and a little coloured ; there is properly no corolla : the stamina consist of four capillary filaments, erect, the length of the calyx, and inserted into the receptacle : the antheræ twin, oblong, four-cornered, obtuse and erect. In the female the calyx and corolla are the same : the pistillum an inferior, ovate, four-cornered germ : the style recurved : the stigmas simple.

The species are : 1. *A. Æthiopicum*, Smooth Amber Tree ; 2. *A. ciliare*, Ciliated Anthospermum ; 3. *A. herbaceum*, Herbaceous Anthospermum.

In the first the male flowers are borne on one plant, and the hermaphrodite flowers on another : its beauty chiefly consists in its small evergreen leaves, which grow as close as heath, and being bruised between the fingers emit a very fragrant odour. The stem is low, but erect and branching.

In the second species the root is perennial and woody : the branches many, scarcely dividing : the leaves narrow and lanceolate : the flowers axillary and sessile : the calyxes four-parted, and the stamens four in number.

In the third species the stalks are herbaceous, diffused, roundish, red and smooth : the branches opposite : the leaves are in whorls, sessile, lanceolate, smooth, and one-nerved : the flowers axillary.

All the species are natives of the Cape.

Culture.—The propagation in these plants may be effected by layers or cuttings, which in the latter case should be made from the young shoots or branches, and planted in pots of good light sandy earth in the early summer months,

a slight portion of water being given, and the pots plunged in a moderate hot-bed. In this way they soon strike root. They may also be raised in beds of light earth, but not so certainly. Proper shade is necessary in both cases. When removed, a ball of earth should be preserved about their roots. They should be placed in a good dry green-house during the autumn and winter seasons, in an open situation, and have occasional slight waterings. Fresh air must also be admitted as much as necessary, as when kept too close they do not succeed well. As these plants do not continue long, they should be frequently renewed by cuttings.

The first species is an ornamental shrubby plant, which has a very pleasing smell.

ANTHYLLIS, a genus containing several herbaceous and shrubby plants.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*, or *Leguminosæ*.

The characters are: that the calyx is a one-leaved, ovate, oblong perianthium, swelling and villose: the mouth five-toothed, unequal and permanent: the corolla papilionaceous; the banner longer; the sides reflex; and the claw the length of the calyx: the wings oblong, shorter than the banner: the keel compressed, the length of the wings, and similar to them: the stamina consist of rising connate filaments: the antheræ simple: the pistillum is an oblong germ: the style simple and ascending: the stigma obtuse: the pericarpium a roundish legume, concealed within the calyx, very small and bivalve: the seeds one or two in number.

The species are numerous; but those cultivated are: 1. *A. barba Jovis*, Silvery Anthyllis, Jupiter's Beard, or Silver Bush; 2. *A. cytisoides*, Downy-leaved Anthyllis; 3. *A. hermanniæ*, Lavender-leaved Anthyllis; 4. *A. erinacea*, Prickly-leaved Anthyllis.

The first is a shrub which often grows ten or twelve feet high, and divides into many lateral branches, with winged leaves, composed of an equal number of narrow leaflets, which are very white and hairy; the flowers are produced at the extremities of the branches, collected into small heads; these are of a bright yellow colour, and appear in June; sometimes they are succeeded by short woolly pods, containing two or three kidney-shaped seeds; which, except the season prove warm, do not ripen in this country. It is a native of the south of France, &c.

The second species is a low shrub, seldom rising above two feet in height, but sends out many slender branches, with hoary leaves, which are sometimes single, but generally have three oval leaflets, the middle one being longer than

the other two: the flowers are yellow, and come out from the side of the branches, three or four joined together, having woolly calyxes, rarely succeeded by seeds in this climate. It is a native of Spain.

The third is a shrub that grows five or six feet high, the branches garnished with oblong, ternate leaves: the flowers, which are yellow, produced in small clusters on the side of the branches; these appear in July and August, but are not succeeded by seeds in this country. It grows naturally in Greece.

The fourth species is a shrub nine or ten feet in height, which has the appearance of one sort of Gorse. It is covered with spines; at the origin of the branches, an ovate scale; leaves oblong-ovate, nappy, three generally next the flowers. It grows naturally in Spain, &c.

Culture.—The method of propagation in the shrubby sorts is either by means of the seeds or by cuttings. In the former mode the seeds should be sown in the autumn in pots filled with light vegetable earth, and protected during the winter season by frames or a green-house. The young plants appear in the following spring; and when they become of pretty strong growth they should be transplanted each into a separate pot of the same sort of mould, being shaded till they have taken fresh root, when they may be placed in some warm situation in assemblage with other hardy exotics till the beginning of autumn, when they must be removed under shelter.

In the latter method the cuttings should be planted out during the summer months on good light earth, being shaded and lightly watered until they have stricken root, when they should be transplanted into separate pots, and managed in the same way as the seedling plants.

The last species is only capable of being propagated by seeds; but is so hardy as to succeed in the open air in mild winters. Frost must however be guarded against, as it soon destroys the plants.

These are ornamental plants for the green-house, and other places about the house during the summer season.

ANTIRRHINUM, a genus including various plants of the herbaceous flowery tribe, commonly known by the titles of *Snap-Drum*, *Calf's-Snout*, and *Toad-Flax*, or *Frog's-Mouth*.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a five-parted permanent perianthium: the divisions

oblong, the two lowermost gaping : the corolla is monopetalous and ringent : the tube oblong, swelling, and opening above with a mouth having two lips, the upper one two-parted and reflex on each side, the under one trifid and obtuse : the palate convex, usually closed by a prominence between the lips, produced from the under lip, the throat being concave beneath, having a prominent nectarium at the base of the corolla, produced downwards and prominent : the stamina consist of two short and two long filaments, inclosed under the upper lip ; the antheræ converging : the pistillum a roundish germ, style simple, of the length and in the situation of the stamens : the stigma obtuse : the pericarpium a roundish capsule, obtuse, two-celled, of different form and aperture in the different species : the seeds numerous : the receptacles uniform, solitary, and affixed to the partition.

The species of most importance for cultivation are : 1. *A. linaria*, Common Yellow Toad-Flax ; 2. *A. cymbalaria*, Ivy-leaved Toad-Flax ; 3. *A. triphyllum*, Three-leaved Toad-Flax ; 4. *A. purpureum*, Purple Toad-Flax ; 5. *A. Monspessulanum*, Montpellier Toad-Flax ; 6. *A. sparteum*, Branching Toad-Flax ; 7. *A. triste*, Dark-flowered Toad-Flax ; 8. *A. pelisserianum*, Violet-coloured Toad-Flax ; 9. *A. multicaule*, Many-stalked Toad-Flax ; 10. *A. Alpinum*, Alpine Toad-Flax ; 11. *A. Dalmaticum*, Dalmatian Shrubby Toad-Flax ; 12. *A. genistæfolium*, Broom-leaved Toad-Flax ; 13. *A. majus*, Great Toad-Flax, or Snap-Dragon ; 14. *A. bellidifolium*, Daisy-leaved Toad-Flax, or Snap-Dragon.

The first species has a hard woody creeping perennial root : the stems several, from one to two feet in height, full of leaves, round and smooth : the leaves pointed, smooth, and of a blueish colour, growing without order : the flowers yellow with the palate orange, villous, in a thick terminal spike : the nectary long and awl-shaped : the upper segment of the calyx a little longer than the rest : the two lower ones gaping, widest : the capsule cylindric, splitting at the top into several equal divisions. It grows by road-sides, and flowers from June to August. By culture the flowers become larger and finer.

The second species has a fibrous perennial root, inserting itself so into the crevices of walls and rocks as scarcely to be eradicated : the stalks are numerous, growing in a tuft, creeping at bottom, branched, round, purplish and stringy : the leaves roundish, shining, somewhat fleshy, some opposite, others alternate, frequently purplish : lobes of the lower ones blunt, upper acute, the smallest only three-lobed : the pe-

tiolos long and grooved above : the peduncles from the axils, one-flowered, round, a little longer than the petioles : the tube of the corolla short : the upper lip purple, with two deeper veins ; segments of the lower whitish : the palate yellow : the mouth or entrance into the tube villous and saffron-coloured : the nectary purple and conical, the length of the calyx : the germ purple : the capsule wrinkled, opening at top into several segments : the seeds are black, roundish and wrinkled like the nut of the walnut. The whole plant is smooth, but has a disagreeable smell.

There is a variety with a white flower.

The third is an annual plant, which rises with an upright branching stalk near a foot and half high, with oval, smooth, gray leaves, placed often by threes, and sometimes by pairs, opposite at the joints ; the flowers grow in short spikes at the top of the stalks ; they are shaped like those of the common sort, but have not such long tubes ; they are yellow, with saffron-coloured chaps. It flowers in July and August, and the seeds ripen in autumn. It grows naturally in Sicily.

There are varieties of this with a purple standard and spur ; and with purple flowers.

In the fourth species the root is perennial : the stem two feet high, round and smooth : the leaves smooth, and marked with three nerves underneath, spreading, alternate : the lower verticillate : the racemes are terminal, simple, erect, long, with pedicels longer than the flower : the calyx minute : the corolla all purple, paler without, with the palate pubescent at the edge ; spur the length of the corolla, bending outwards : the capsule subglobular : the seeds three-sided-angular, or a little compressed : the angles acute, margined, smooth, and vermicularly wrinkled between them ; the colour of smoke. It is a native of Italy.

The fifth has a perennial root, from which arise many branching stalks near two feet high, with very narrow leaves growing in clusters, and of a grayish colour. The flowers are produced in loose spikes at the end of the branches ; they are of a pale blue, and have a sweet smell. These appear in June ; and there is often a succession of flowers on the plants till winter : the bractes are lanceolate, one at the base of each peduncle : the corolla pale blue, with darker spots ; spur nearly as long as the body of the corolla : the calyx very small, and the segments acute.

In the sixth species the stem is a foot high, quite smooth, panicked, erect, but not very stiff, with wand-like branches. Primordial leaves, before the stalk shoots up, ternate, oblong ; the rest alternate, awl-shaped, channelled, smooth,

fleshy, and straight; the flowers are racemose: the calyxes smooth, or rather somewhat villose: the corollas yellow: the palate smooth, with a tinge of red in the retuse elevation of it.

The seventh has several smooth stems, eight or nine inches long, usually decumbent: the leaves rather fleshy, convex and glaucous: the calyx and bractes only pubescent: the corolla very dark purple, with the spur streaked: it often varies of an ash, yellow, or lighter purple. By Curtis it is said to be of a fine rich brown inclining to purple: the capsule is shaped like the human skull. It is a native of Spain, and flowers during most of the summer months.

The eighth species has an annual root: the stem six or eight inches high, erect, round, very smooth, branching a little: the leaves very remote, rather fleshy and smooth: the radical or lower ones three or four together: the flowers in a head or corymb, and small: the calyx erect, not close, but with distant divisions: the corolla purple, with a white palate marked with obscure veins, purple: the upper lip longest; spur straight, as long or longer than the corolla. It is a native of France, &c.

The ninth is an annual plant, from whose root proceed many stalks, which are lax and rushy, very slender, and about a foot in height; on the lower part they have five very narrow, linear, obtuse leaves at each joint; but upwards they are sometimes by pairs, and sometimes single: the stalks are divided into many small branches, with little yellow flowers coming out singly at a distance from each other, which appear in July, and ripen their seeds in August. It is a native of Sicily.

There are two varieties of this plant, one with a deep yellow-coloured flower, the other with a sulphur-coloured flower.

In the tenth species the root is perennial: the stems slender, branching at bottom, growing thicker towards the top, from two to seven inches long, ascending, round and smooth: the leaves quite entire, without veins, and thick; the lowest smaller, and in fours: the upper ones solitary, or two opposite, or sometimes three: the flowers in a close raceme at the ends of the stalks; they are very elegant, of a fine violet purple colour, with a rich gold colour in the middle, and are in blow most part of the summer. It is a native of the Alps.

The eleventh species rises with a strong woody stalk, three feet high, having smooth, spear-shaped leaves, placed alternately, and sitting close to the stalk. The flowers are produced at the end of the branches in short loose spikes; these are of a deep yellow colour, much

larger than those of the common sort, and stand upon short foot-stalks. It flowers in July, but the seeds rarely ripen in this climate, which makes the plants scarce. It is a native of Crete, &c.

The twelfth is a biennial or perennial plant, which rises with an upright, branching stalk from three to four feet high, having spear-shaped, alternate leaves, ending in acute points, and of a grayish colour. The flowers are produced at the end of the branches, in loose panicles; they are of a bright yellow colour. It is a native of Siberia, &c.

In the thirteenth the root is biennial: the stem from a foot or eighteen inches to two and even three feet in height, upright, round, solid, smooth at bottom, but pubescent higher up: the leaves are lanceolate or ovate, blunt, the lower mostly opposite, the upper inclined to be alternate: the flowers in a spike, pointing one way, large and handsome, on a very short, hairy peduncle, supported by a short, concave, acuminate bracte: the nectary obtuse, scarcely prominent: the capsule obliquely opening at top, unequal at the base; vulgarly compared in shape to a calf's head: the tops of the stalks and the calyxes are usually viscid. It is a native of the south of Europe, and flowers in June and July.

There are a great many varieties, as with red, yellow, purple and white flowers, red with white or yellow mouths, white and red, yellow and red, yellow and white, purple and white, purple with yellow mouths, with scarlet dotted with gold colour, with double flowers, and variegated leaves.

The fourteenth species is a biennial, or at most a triennial plant, which frequently perishes soon after the seeds are ripened. The stem is erect, two feet high, branching, terminated with a long thin spike: the stem-leaves small and three-parted, sometimes five-parted, very different from the broad, serrate, radical ones: the bractes one-flowered, linear, long, sometimes trifid: the flowers very small, on short peduncles, in a very long raceme, containing frequently an hundred flowers: the segments of the calyx almost capillary: the corolla blue, nodding, quinquefid, two of the divisions erect, three nodding; throat open without any palate; spur short, bent back: the anthers reflex, dark blue. It is a native of Spain, &c.

Culture.—In most of the plants of the Toad-Flax kind the propagation may be readily effected by sowing the seeds either in the autumn or the spring, in situations where they are to remain, and where the soil is light and not enriched by manure. The seeds of the third, sixth and ele-

venth species are best put into the ground in the spring; and those of the fourth, fifth, eighth and ninth in the autumn. The first species may be increased by the trailing stalks which put out roots from the joints. It will succeed in any soil or situation. The fourth and fifth species may likewise be propagated by parting the roots. The seventh and tenth may be raised by cuttings, which should be planted out in a shady situation in the summer season, and when they have taken good root they may be removed into pots of light earth of the poorer sort. The striped varieties must also be propagated by cuttings, in the same way as the above.

The plants raised by cuttings should be sheltered during the winter months, fresh air being admitted freely in mild weather. When protected under a hot-bed frame they succeed better than in the green-house, as in the latter situation the plants are apt to be drawn up weak.

The plants raised from seed should be removed into pots, of light sandy earth, especially in the eleventh species, till they have taken fresh root, being then exposed in assemblage with other hardy exotic plants till October, when they should be placed in a hot-bed frame to be protected from frost. Some may likewise be planted out in warm situations on rubbish or poor sandy soils, where they will frequently stand in mild winters, as in such situations they resist cold the best.

In the Snap-dragon kind the propagation may be accomplished either by the seed or by cuttings. When the former method is practised, the seeds in the thirteenth species should be sown in the spring, as in April or May, in the places where they are to remain, where they will produce flowers in the following spring. But in the fourteenth species the seed should be sown in the autumn on borders or other places, where they are to remain. They must be thinned in the following spring, and they mostly flower in the second. If the former of these sorts be designed to grow on rocky barren situations, the seeds should be sown in March, where they are to remain.

Where the latter mode is employed, the cuttings should be made in the summer season, and planted out in a proper shade till they have stricken root.

These are most of them plants adapted to the purpose of ornament, either in rocky barren situations, or in the borders, clumps or other parts of gardens and pleasure-grounds. The first species is particularly suited for covering rock work, and the thirteenth also grows well in such situations, and it as well as most

of the other species is adapted for the purpose of affording variety in the larger borders or other compartments. They last the longest in dry poor rocky situations.

APIUM, a genus comprehending different herbaceous biennials for culinary use.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel of fewer rays, or partial of more; the involucre universal small, of one or more leaflets, or partial smaller: the perianth proper and obsolete: the corolla universal and uniform: the floscules almost all fertile: the petals proper, roundish, inflex and equal: the stamina consist of simple filaments: the antheræ roundish: the pistillum an inferior germ: the styles reflex: the stigma obtuse; no pericarpium; fruit ovate, striated, and splitting in two: the seeds two, ovate, striated on one side, and plane on the other.

The species according to Martyn are: 1. *A. petroselinum*, Parsley; 2. *A. graveolens*, Smallage.

In the first the stems are round, smooth, striated. Usually there is one leaflet at the origin of the universal umbel, and an involucre of from six to eight short folioles fine almost as hairs to the partial umbel: the flowers pale yellow and regular: the petals small, long, narrow, acuminate and inflex: the seed short and turgid. It is a native of Sardinia.

The varieties as described by the above writer are: Common Plane-leaved Parsley; Curled Parsley; and Large-rooted or Hamburg Parsley.

As the Plane-leaved Parsley has much resemblance to the Wild or Fool's Parsley, which is poisonous, the surest way to avoid any hazard is to cultivate the curled, which is said to remain constant, provided care be taken to separate all the plants which have plain leaves, when seed is to be saved from them.

The Large-rooted variety is chiefly cultivated for its roots, which are now pretty commonly sold in the markets: the leaves have much longer foot-stalks, and their subdivisions are not so numerous as in the common sort: the leaflets are much larger, and of a darker green, so that it is easily distinguished from the common kind by its leaves; but the roots are six times as large as those of the Common Parsley can be brought to with the utmost culture.

In the second species the stem is smooth, shining and deeply furrowed: the leaves alternate, radical, pinnated, ternate; pinnae trifid, gash-serrate, shining and smooth: the upper leaves ternate and subsessile: the umbel sub-

sessile or peduncled, with about fifteen unequal rays at each axilla, supported by a trifid leaf: the universal involucre is often wanting: the corollas are small and white: the seeds very small.

Miller cultivated Smalage many years, to try if by art it could be brought to the same goodness as Celery; but all that he could do was to bring it to a larger size, and by earthing to give it a whiteness: it would not grow tall, nor rise with a straight stem, but sent out many suckers near the root, and after it was blanched retained its strong rank taste. But in more southern climates this change has been effected with success.

The varieties according to Martyn are: Sweet or Upright Celery, and Turnip-rooted Celery or Celeriæ. The London gardeners cultivate two varieties: the Hollow Celery, which has been long known, and the Solid, which is of later introduction, and is preferred by some for soups and stewing; but supposed by others not so proper for the main winter crop, because it will not endure the frost so well; nor for the market gardener, because it is very brittle, and easily breaks in washing and bunching up.

The Turnip-rooted Celery was formerly supposed to be a degenerate variety from the common sort; but this opinion does not seem well-founded, as from many years trial it has never been found to vary. The leaves of this are short, when compared with those of the other, and spread open horizontally; the roots grow nearly as large as the common Turnip. The difference proceeding from culture has been chiefly in the size of the roots; those properly cultivated on rich ground being much larger than those on poorer land, but the leaves and outward appearance of the plants never alter.

Culture.—In the first or Parsley kinds, the propagation is constantly accomplished by sowing the seeds; the proper season for doing which in the different varieties is any time from the beginning of February till the beginning of May, but they will grow at almost any time of the year; but to have the plants come into use by the time the old Parsley begins to run to seed, it is necessary to make the first sowing about the time just mentioned. The best method for this is in drills, on the sides of the beds; as it is thus not only more conveniently kept clean and more easily gathered, but has a better appearance. Where only required for the use of a family, it may be put in single drills; but for the supply of markets, it is generally sown in large plats, either in broad-cast, raking it in, or in shallow drills, at eight or nine inches distance from each other, trimming the earth evenly over it, to nearly the depth of half an inch, and

then raking the surface, to give it a degree of smoothness. This kind of seed is extremely slow in vegetating, sometimes not appearing in less than a month or five weeks from the period of its being sown. The chief culture the plants require while growing, is to be kept clean from weeds; and when they grow faster than wanted, which is often the case in private gardens, to be cut down close. This should be constantly practised in autumn, as about Michaelmas, or in sufficient time for the plants to recover before the winter sets in.

In the management of this useful plant, great care should be taken, as already observed, always to sow such seed as has been collected from the best curled-leaved plants; and in order to save the seed, some rows of the best one year old plants should be permitted to stand and shoot up their stalks, which is done the May and June following, the seed being ripened in July and August.

In the large-rooted variety the seed should be sown in February or March, in situations where the plants are to remain. For this purpose a spot of light rich earth in an open exposure should be preferred, the seed being sown broad-cast and raked in, the plants generally appearing in about a month after being sown, and in April or May require to be thinned out to the distance of six inches, and cleared of weeds, which may be performed either by the hand or hoe; but the latter is most eligible, as it stirs and loosens the surface of the earth, which is beneficial to the plants. About the latter end of July the roots have mostly attained a proper size for use, and may be drawn occasionally; but they seldom acquire their full growth till Michaelmas. This is sometimes called *Hamburgh Parsley*, probably from its being much cultivated about that place. It is chiefly cultivated and esteemed for its large roots, which are white and carrot-shaped, being long, taper, and of downright growth, often attaining the size and appearance of small or middling parsnips. They boil exceedingly tender, and are very palatable and wholesome, being used in soups or broths, or to eat as carrots and parsnips, or as sauce to flesh meat.

In the cultivated varieties of the second species, the propagation is by sowing the seed in the spring months, as from March till the latter end of April; and when the plants have attained six or eight inches in height, transplanting them into trenches, in the manner described below, in order to be earthed up on each side as they advance in growth, and have their stalks blanched or whitened, to render them crisp and tender. As plants of this kind continue useful only one

year, a fresh supply must be annually raised. The sowing, if a regular succession of plants be required for eight or nine months in the year, should be at two or three different times in the above months. Thus, if it be intended to have Celery for use as early as possible in the summer, as in July, some seed must be sown the first week in March on a warm border, or, to bring the plants more forward, in a slender hot-bed, or if it be necessary to have it still more early, the middle of February; but as the plants of these very early sowings are apt to pipe or run for seed the same year before they attain their perfection, a few only need be raised. But for the principal crops, to come in for autumn or winter, as in August or September, and continue in perfection till Christmas or spring, the seed may be put in about the middle or towards the latter end of March, or in the first or second week in April, in a bed of natural earth in an open exposure; and a little more in the latter end of the latter month, or in the first or second week in May, to furnish a still later crop to come in the beginning of November, and continue good till the March or April following; and to have a late crop principally for the spring, it is necessary that a small portion be sown at the latter end of May; and by putting out some of the plants in shallow trenches in September, October and November, they may be fit for use in March and April, and continue without running till the middle or latter end of the May following. As it has been suggested, that the early crop may either be raised upon a warm border of natural earth, or upon a slight hot-bed, it may be observed, that by the latter practice the plants may be so forwarded, as to be fit to transplant into trenches sooner by three weeks or a month than those raised in the natural ground; a small bed of about eighteen or twenty inches in depth of dung being sufficient, which may be sheltered either by a small frame, or occasionally by mats supported on bent sticks: upon this five or six inches of rich light earth should be laid, the seed being then sown on the surface, and lightly covered in. When the plants appear, the full air must be freely admitted in mild days, but sheltered with glasses or mats in the nights until they acquire some strength, light waterings being occasionally given. When the plants of either of the sowings are two inches high, some of the stoutest should be pricked out into a bed of rich earth, in a sheltered situation, three inches apart; or to bring them still more forward, upon a slender hot-bed, and occasionally sheltered by mats, giving them water, and occasionally shading them till they have struck root; and if rain do not soon

fall, refreshing them as frequently as may be necessary with water.

As the plants thus first pricked out will in May or the beginning of June be generally five or six inches in height, some of the strongest of them should be transplanted into trenches, in order to their being blanched.

In sowing the main and later crops, make choice of a spot of rich light earth, in an open situation, and let it be neatly dug and divided into one or more beds; but one bed is generally sufficient for private use, which should be three feet and a half wide, the surface being made level and smooth. The seed may then either be sown on the surface, and raked in lightly, or the surface first raked fine, and the seed then sown, earth being lightly sifted over it; or the bed, after being first raked smooth, may have the earth shoved with the back of a rake from off the surface into the alley; the seed then sown, and with the rake turned the right way, the earth drawn upon the bed again with a kind of jirk, so that it may spread and cover it equally. When the plants of these sowings are come up, they should be frequently watered in dry weather, especially while they are young; and when about three or four inches high, the seed-bed be thinned by pricking out a quantity of the strongest into an open rich spot, properly dug and divided into beds three feet and a half wide, taking an opportunity, if possible, of moist weather for the business, and in rows six inches asunder, and three or four inches distant in each row, water being given; and, if dry weather succeeds, occasionally repeated till they strike fresh root. In this bed they should remain a month, or five or six weeks, to acquire due strength previous to their being transplanted into the trenches for blanching. The same seed-bed may frequently afford three, four, or more different drawings to prick out in this way, by observing to only prick out the largest plants regularly each time, before they draw each other up weak by close standing: by thus pricking them in beds till the ground intended for the trenches is ready, they will be advancing in their growth, and be considerably better prepared for setting out, than such as have remained constantly in the seed-bed.

The next operation is that of transplanting them into the trenches for the purpose of blanching; the season for which is occasionally from the middle of May till the latter end of October, or even the middle of November, according to the forwardness of the plants, the time they are required for use, and the period it is intended they should continue. When the plants are from six to eight, ten, or twelve inches

in height, they are in a proper state for transplanting into the trenches. It is necessary always to make at least three different transplantings, allowing the distance of three or four weeks, or more, between each; and when the plants are required for use as early in the summer as possible, and to be continued in the spring as late as the middle or latter end of May. It is proper to plant four, five, or even six different crops, allowing the distance of time just mentioned between each separate crop; observing that the crops principally intended for spring use be of the latest sown plants, and not planted in the trenches until September, October, and the beginning of November.

In making the trenches, choose a dry rich spot of ground, in an open quarter, and with a line and spade mark and chop out the trenches crossways of the piece of ground, each trench twelve inches, or about one spade's breadth wide, and allow a space of three feet between trench and trench, that there may be sufficient scope to have a due portion of mould to earth up the plants to a proper height: the trenches being marked in this manner, proceed to dig them out, in order to form the furrow for the reception of the plants, which should be done to the depth of a moderate spade, or about six or eight inches for the early crops; but the later ones do not require so much, without taking out any shovellings; laying the spits of earth alternately to the right and left on the spaces between, levelling them neatly and beating up the edges firm and straight; then let the bottom be properly dug and levelled; or if the ground be poor, first spread in two or three inches depth of rotten dung, and cover it four or five inches deep with earth. The trenches being thus prepared, a quantity of the best plants must be drawn, and after the ends of their roots, and the tops of the straggling leaves have been trimmed off, a row planted exactly along the middle of each trench, placing them four or five inches distant, a good watering being immediately given out of a pot with the rose on, and which, if showers do not fall, should be repeated every other evening, at least till the plants have taken fresh root. Only a few of the very early plants, as those sown in February or early in March, should be planted out at a time, as they are apt to pipe almost as soon as they are blanched, or sometimes before that is fully effected.

When it happens that the plants intended to be planted out in autumn for the late crops have stood so long in the seed or pricking-out beds as to have become rank, and drawn each other up weak, it may be proper to retard

their running up tall, in order to obtain them of robust growth against October and November for planting in shallow trenches: to effect this, it will be advisable, in August or the beginning of September, either to cut them down low to shoot out again, or transplant them into rows nine inches distant.

Another method of planting and making the trenches, but which is less in use, is with a line and spade to cut or mark out a bed, six feet wide, crossways the ground; then to begin at one end, and proceed to dig out a cavity the above width and length, one spade deep, laying the spits of earth to the right and left in a ridge along each side of the cavity or trench, beating it up in front that it may not slip down; and when the trench is thus dug, to loosen and level the bottom; and where dung is necessary, to add it, digging it into the bottom four or five inches deep. When more than one of such trenches are to be made, a clear space of six feet must be allowed between trench and trench, to contain the earth dug out, and to have a sufficiency to bring up to the plants afterwards.

The trenches being thus prepared, the plants are to be trimmed as before directed, and then planted out, observing that they are here to be planted in rows crossways the trench, about a foot asunder, and in other respects as in the former method.

Plants of this sort, in order to whiten or blanch the stalks, and render them crisp, tender, and of a grateful flavour, require to be earthed up as they rise in height on each side; for which purpose the earth that was dug out of the trenches is to be employed; and when that is expended the spaces between them must be dug out, broken and applied repeatedly as the plants advance in growth: in this way blanching them from ten or twelve, to fifteen or eighteen inches or more in height. The proper time to begin this work is when the plants are about ten or twelve inches high, which should be repeated every fortnight or three weeks, according to their growth. In performing the work, regard must be had to break the earth, when lumpy, moderately small with the spade; or the first and second earthings may be performed with a large hoe, but afterwards a spade is to be preferred, and care taken to trim the earth up lightly to the plants, so as not to break the stalks of the leaves, or force the mould into their hearts. The first time they may be earthed three, four, or five inches, according to the size and height of the plants, observing the same rule at each time, till they are by degrees

earthed up to twelve inches, but fifteen or twenty are better. By this means, if the soil be rich, those of the main crop that have been planted out in the end of June or in July, sometimes make such progress, that by September or October they may be blanched eighteen inches or near two feet in length. These earthings are to be continued to the later crops occasionally until Christmas, or as long as the plants continue to grow in height during the winter; at which season, as about November and December, it is proper to earth them up pretty near their tops previously to hard frost setting in, which often destroys such plants as are out of the ground; and which, if of considerable duration, would occasion the decay of most of the other parts that are within the earth. But in the late crops, planted in October or November for spring use, such plants as are of small or low growth will probably require little or no earthing till February or March; at which time they should be earthed up moderately, according to their growth, to have them for April or May, when the general crops are finished. In earthing up the plants that are planted in the latter of the above methods, it will be necessary to trim the earth in well between the rows, taking it equally from the different sides; in doing which it is of advantage, where the plants have attained a large growth, to be furnished with a couple of thin boards six feet long, which are to be used at the time of earthing, to slip into the spaces between the rows of the plants, to keep the stalks and leaves up close just till the earth is put in, placing them close to the plants, and then trimming in the earth between them; and when one space is thus earthed, drawing out the boards, and placing them in the next. The different earthings should always, if possible, be performed when the plants are dry, as where this circumstance is not attended to they are apt to become spotted and cankered. Some of the first earthed up plants, where they have been planted in the trenches in May, or the beginning of June, will generally be fit to take up in July; for when such early plants are blanched five or six inches in length, it is time to begin to take them up, as they rarely continue long before they begin to pipe and become useless. But the plants of the main crop will seldom be blanched any considerable length, till the middle or latter end of August and beginning of September, and will not have acquired their full perfection until October, as observed above. However, where there is much demand for the plants, you may begin to take some up when they are blanched six or seven inches, as, if properly followed with

earthing, they will be daily increasing in length in the blanched part. In winter, at the approach of a very severe frost, it may sometimes be of advantage to cover some of the rows of the main crop with dry long litter to save the plants, and prevent the ground being frozen hard, that the plants may be readily dug up when wanted. And when a hard frost is expected, a quantity of the plants may be taken up for use, and laid in some dry earth in a shed, or other sheltered place.

In the culture of the Turnip-rooted variety, the seed should be sown in an open rich spot in March or April, as directed for the common sort; and when the plants are an inch or two in height, they should be thinned out to three inches; and when at four, five, or six inches in height, transplanted into shallow trenches; previously to which the ground must be dug all over one spade deep, and drills three inches deep, and eighteen asunder, made with a hoe, in which the plants are to be set six inches distant. When they are advanced nine or ten inches in growth, examine the progress of the roots; and if they have acquired a tolerable size, draw earth up to each side of the row of the plants, three or four inches high, which being well watered, will be sufficient to improve the roots. They are generally fit to take up for use in a fortnight or three weeks afterwards.

In saving the seed of Celery, great care should be taken to select the best plants which have not been much blanched, planting them out at the distance of a foot in the early spring months in rich moist soil; and when they have run up to seed, to support them with stakes, till the seed ripens in August, when they should be cut, when dry, and laid to harden in the sun on cloths, after which the seeds should be beaten out and put up in bags for use, being kept dry.

APOCYNUM, a genus containing hardy, herbaceous, perennial and shrubby tender exotics, of the flowering kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order *Contortæ*.

The characters are: that the calyx is a one-leaved, five-parted, acute, short, and permanent perianthium: the corolla is monopetalous, bell-shaped, and semiquinquefid: the divisions revolute: the nectary consists of five glandular oval capsules surrounding the germ: the stamina consist of very short filaments: the anthers oblong, erect, acute, bifid at the base, converging: the pistillum consisting of two ovate germs: the styles short: the stigmas roundish, bifid at the top, muciculate, glued to the anthers: the pericarpium consists of two long, acuminate, one-

valved, one-celled follicles: containing many very small seeds, crowned with long down; the receptacle subulate, very long, rough, and free.

The species are: 1. *A. androsæmifolium*, Tutsan-leaved Dogs-bane; 2. *A. canabinum*, Hemp Dogs-bane; 3. *A. hypericifolium*, St. John's Wort-leaved Dogs-bane; 4. *A. Venetum*, Venetian Spear-leaved Dogs-bane; 5. *A. frutescens*, Shrubby Dogs-bane; 6. *A. reticulatum*, Net-leaved Climbing Dogs-bane.

The first has the stems about three feet in height, and upright. The leaves are opposite; and these and the stems abound with a milky juice, which flows out when they are broken. The corollas are white, with the nectaries of a purplish cast. But, according to some, they are pale red with a tinge of purple, the flowers being pendulous. It is a native of Virginia, and flowers from July to September. It is perennial.

The second species has the roots perennial, and creeping. The stems are brown, and about two feet in height. The leaves are smooth, in pairs, abounding with a milky juice, like the former. Towards the upper part of the stem, the flowers come out from the wings of the leaves, in small bunches, and are of an herbaceous white colour, and small. It is admitted for the sake of variety. It flowers as above; and is a native of the same place. The stems afford a milky substance.

In the third the root is likewise perennial, and creeping. The stems annual, upright, round, branched, a foot and a half in height, and filled with a white pith. The leaves opposite, sharpish, quite entire, subsessile; the upper ones on the extreme twigs petioled, not revolute. The peduncles umbelled, and terminating. The flowers small, and inodorous. The leaflets of the calyx are oblong, concave, erect, and green. The corolla white, and longer than the calyx. Between the filaments there is a roundish, green gland. The whole plant is smooth, and abounds with a milky juice. It is a native of North America, and flowers in June and July.

The fourth species has the root perennial, and creeping. The stems about two feet high. The leaves opposite and smooth. The flowers grow erect, at the top of the stems in small umbels, and are much larger than in the former sorts. It is a native of the islands in the Adriatic sea, and flowers in July and August.

There are varieties with purple, and with white flowers.

In the fifth the stem is woody, five or six feet in height, dividing into several branches. Leaves opposite, petioled, smooth, quite entire. The

peduncles from the axils, opposite; being oppositely branched. The corolla salver-shaped. The flowers are in loose bunches, small, and of a purple colour; but never succeeded by pods in this country. It is a native of the East Indies, &c.

The sixth species has a twining stem, by which it rises to a considerable height. The leaves are dark green, very shining, with a beautiful net of milky veins. It is a native of the East Indies, &c.

Culture.—The four first species are capable of being easily propagated, by dividing their creeping roots either in the early spring months, before they protrude their stems, or in the autumn. The soil most proper for them is that of the light dry kind, as, where there is much moisture, they are apt to be destroyed in the winter season by their roots becoming rotten. In the second species the roots sometimes spread in a troublesome manner.

The fourth species requires a very dry, warm exposure; as it is less hardy than the former. It is best to remove it when necessary in the early spring, when it is about to send forth its stems.

The two last species are best propagated by layers or cuttings from their young shoots, which should be made during the summer season, being dried in the stove some days before they are planted out. They are likewise capable of being raised by seed, when it can be procured, as they seldom afford any in this climate. In either method, pots of light sandy earth should be employed. In the former, the layers or cuttings, after being planted out in them, should be placed in a mild hot-bed; and in the latter, after the seeds are sown, the pots should be plunged into a tan-bed. When the plants are up they must be watered sparingly, and kept constantly in the tan, being changed into larger pots as they advance in growth, great care being taken not to over-pot them, as they thrive best where their roots are a little confined. Under good management, they mostly flower in the second year.

The first kinds are sufficiently hardy to bear the exposure of the open air; but the latter sorts require the constant protection of the stove. The former are well adapted for producing variety in the clumps and borders of walks in pleasure-grounds; and the latter for ornament in the stove, where, from their beautiful ever-green leaves, they have a fine appearance.

APPLE-TREE. See *Pyrus Malus*.

APRICOT. See *Prunus*.

AQUILEGIA, a genus containing plants of the hardy herbaceous perennial flowering tribe, and Columbine kind.

It belongs to the class and order *Polyandria*

Pentagynia, and ranks in the natural order of *Multisiliquæ*.

The characters of which are : that there is no calyx : the corolla consists of five lanceolate-ovate, flat, equal-spreading petals : the nectaries five, equal, alternate with the petals ; each horned, and gradually broader upwards, with an oblique mouth ascending outwardly, and annexed inwardly to the receptacle, produced below into a long attenuated tube with an obtuse top. The stamina consist of numerous filaments, subulate ; the outer ones shorter, and oblong erect antheræ the height of the nectaries : the pistillum consists of five ovate, oblong germs ; ending in subulate styles longer than the stamina, and erect simple stigmas ; the chaffs ten, wrinkled, short, separate, and involving the germs : the pericarpium consists of five erect, distinct, cylindrical capsules, gaping from top inward, containing numerous ovate, shining seeds, annexed to the gaping suture.

The species are : 1. *A. vulgaris*, Common Columbine ; 2. *A. Alpina*, Mountain Columbine ; 3. *A. Canadensis*, Canadian Dwarf Columbine.

In the first the stem is three feet high, erect, branching, leafy, and somewhat angular. The leaves smooth, glaucous underneath ; the lower ones petiolate, biternate ; the leaflets roundish, trilobate, gashed and notched ; the upper ones digitate, the lobes oval and quite entire : the radical petioles very long. The flowers are produced from the tops of the naked branches, and hang down ; they have generally six pistils and eight nectaries. It is a native of most parts of Europe, and perennial, flowering in June.

There are several varieties, the flowers varying greatly by culture, becoming double either by multiplying the petals or the nectaries. And of all these varieties, there are subordinate variations, both in the degree of doubleness, as with two or more rows of petals, two or three rows of nectaries, curiously inserted one into the other ; and in the colours, as blue, white, red, purple, flesh-coloured, ash-coloured, chestnut-coloured, and striped or variegated blue and purple, blue and white, red and white, &c.

The second species has the root biennial. The leaves biternate, tender, and smaller than in the common sort ; the leaflets multifid ; the lobes sublinear and blunt ; with the appearance and tenderness of the Canadian Columbine. It is a native of the Alps, &c. and flowers in May and June.

The third has likewise a perennial root. The stems are very slender, and reddish. The leaves in the lower ones biternate, irregularly divided,

the extreme lobes blunt ; the upper ones simply ternate, toothed or quite entire ; the uppermost simple, lanceolate, and acuminate. The corollas yellow within, and red on the outside. It is a native of Virginia, &c. and flowers in April.

Culture.—The culture in these plants may be effected, either by sowing the seeds, or parting the old roots ; but the first is the best practice, as the old roots are apt to decline and degenerate after they have blown a few seasons. The seed may be put in either in the autumn or spring season ; but the former is the better, as seed which has remained long out of the ground seldom grows well. A bed of fresh light earth is the best for the purpose. In the following spring the plants should be kept clear from weeds, and occasionally watered when the season is dry ; being transplanted into other beds of the same sort, during the summer or autumn, according to their growth, at the distance of eight or ten inches every way ; water being given when necessary. The plants mostly blow in the following summer, but seldom in a strong manner. The best flowering roots should therefore be taken up in the autumn, and planted out in such situations in the garden and pleasure-grounds as they are designed to remain in. In order to prevent the roots from degenerating by the reception of the farina of other flowers, the flower-stems should be cut down immediately after they have blown. And to keep up a proper succession of fine flowers, some plants should be raised every two years from seed.

In saving the seed of the variegated kinds, great care should be taken that no plain flowers be left among them.

The different varieties of these plants are capable of being increased by parting the roots of the young plants, such as those of three years old, in the autumn or spring.

The only general culture these plants require, is that of keeping them free from weeds, and cutting the decayed stems down in the autumnal season.

The last species often flowers sooner by a month than those of the other kinds.

All the varieties of the first, however much they may seem to differ in form, colour, size, structure, and variegation, are capable of being produced from seed of the same plant.

They are all adapted to afford variety in pleasure grounds and gardens ; and the Canadian sort is esteemed for the early appearance of its flowers.

ARABIS, a genus comprising plants of the hardy perennial and other kinds.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosae*.

The characters are, that the calyx is a four-leaved deciduous perianthium; the leaflets from parallel converging; the two opposite larger, ovate, oblong, acute, a little prominent at the base, gibbose, concave; the two others linear, erect. The corolla four-petalled and cruciform. The petals spreading, and ending in claws the length of the calyx: the nectaries four, each from a little scale within the bottom of the calycine leaflet, affixed to the receptacle, reflex and permanent. The stamina consist of subulate upright filaments; two the length of the calyx, four twice as long; the antheræ cordate and erect. The pistillum a columnar germ, the length of the stamina: no style; the stigma obtuse, and entire. The pericarpium is a compressed, very long, linear, unequal *siliqua*, with swellings at the seeds; valves almost the length of the partition; the seeds numerous, roundish, and compressed.

The species principally cultivated is the *A. Alpina*, Alpine Wall-cress.

It is a perennial plant, increasing very fast by its creeping roots, which run obliquely near the surface, and send out fibres at every joint. The root-leaves are collected into heads, spreading circularly: they are oblong, whitish, and indented on their edges. From the middle of these heads arise the flowering stems, which grow near a foot high; with leaves on them placed alternately, broader at their base than those which grow below, and closely embracing the stem. The flowers grow in loose bunches towards the top: the petals are white, obtuse and entire: the calyx is yellowish, shorter by one third than the corolla. It is a native of the Alps, and flowers in April.

Culture.—The propagation of this plant is readily effected by the seeds, or the parting of its creeping roots. In the first method the seed may either be sown in the autumn, or left to be scattered by the plants. But in the latter, which is the most common method, the roots are parted and planted out in the autumn, in places where they are to remain.

It succeeds in almost any situation, and is extremely hardy, of course adapted to cold exposed situations, where the finer sorts of flowering plants do not succeed. It affords a pleasing variety when planted among shrubs, in clumps, or borders; it is esteemed for its very early flowering, and the pretty appearance it makes in cold exposed situations, where few others thrive.

ARALIA, a genus comprehending plants of

the herbaceous and woody kinds. The Berry-bearing *Angelica*, and *Angelica Tree*.

It belongs to the class and order of *Pentandria Pentagynia*, and ranks in the natural order of *Hederaceae*.

The characters are: that the calyx is a very small involucre, of a globular umbellule: the perianthium five-toothed, very small, and superior: the corolla consists of five ovate, acute, sessile and reflex petals: the stamina have five subulate filaments the length of the corolla: the antheræ are roundish: the pistillum is a roundish germ, inferior: the styles very short but permanent, and the stigmas simple: the pericarpium, a roundish, striated, crowned, five-celled berry: the seeds hard, oblong and solitary.

The species are: 1. *A. spinosa*, Thorny Aralia, or *Angelica Tree*; 2. *A. racemosa*, Berry-bearing Aralia; 3. *A. nudicaulis*, Naked-stalked Aralia.

The first rises with a woody stem to the height of eight or ten feet, dividing into several branches, with branching leaves, composed of many divaricated wings, with oblong leaflets: the ribs of the leaves, as also the branches and stem, are armed with strong crooked spines, rendering the places where the plants grow in plenty very difficult to pass through. The flowers are produced in large loose umbels, at the extremities of the branches, and are of an herbaceous colour. The berry is three-cornered and three-celled. It is a native of Virginia.

The second species grows three or four feet in height, and divides into many irregular branches. The leaves are ramose and alternate: the peduncles axillary, terminated by round umbels of small four-leaved flowers, of a whitish colour; succeeded by round channelled berries, which when ripe are black. It flowers in July, and the seeds ripen in October, and is a native of Canada.

In the third species the stem is so very short as scarcely to be called any: the leaves are decomposed, with long petioles: the leaflets pinnate with five serrate pinnae. A scape arises between two leaves, which is trifid, or bears three umbellules. It rises nearly to the same height as the former. The flower-stalks spring immediately from the root, and are terminated by round umbels of flowers, in shape and colour like the foregoing; but the berries are smaller. It flowers towards the end of July, and the seeds ripen late in the autumn. It is a native of Virginia.

Culture.—The propagation in these plants may be accomplished either by sowing the seeds or dividing the roots. In the first method, with the first species, the seeds should be sown

in the spring, as soon as procured from America, in pots of light earth, being thinly covered with mould, and then brought forward by having them placed in a very gentle hot-bed. If the plants do not appear in the first spring after being sown in this way, they should be kept clear from weeds till the following autumn, and then plunged into an old tan-bed, being protected in the winter; and in the very early part of the succeeding spring removed into a gentle hot-bed, to get them forward and of vigorous growth. Where bark-beds are not at hand, the pots may be placed out on warm sheltered borders, being carefully protected during the winter by a garden frame or other means; but the hot-bed is the best mode. In either method, as soon as the plants are up they should have water given them occasionally, and be well shaded from the sun in the summer months; fresh air being admitted pretty freely to them in mild weather, in order to prevent their growing up weakly.

The plants should not be disturbed the first season; but as in their early growth they are often injured by frost, in October the pots should be placed under a frame, where they may be well screened, but constantly opened to enjoy the free air in fine weather. In the following spring, before they begin to push, they should be carefully shaken out of the pots, and separated; part of them being planted singly into small pots, and the other in a bed of light earth in a warm situation. When those planted in small pots are plunged in a moderate hot-bed, it greatly forwards their growth; but they should be inured to the open air as much as possible. In the following summer they should have a shady situation, and the next winter be sheltered again; and the spring following they may be shaken out of the pots, and planted where they are to remain. The plants which were planted in the bed will require protection from frost the first winter; but if the surface of the ground be covered with old tan, it will prevent it from penetrating to their roots; and if in hard frosts some straw, peas-haulm, or any light covering be laid over the bed, it will secure their stems from being injured. The plants in these beds should remain two years, by which time they will be sufficiently strong to transplant into the places where they are to grow. These plants, from their not coming out early in the spring, often continue growing late in the autumn, which causes the extreme parts of their shoots to be tender, by which they often suffer from the early frosts in autumn, which frequently kill the upper parts of the shoots; but as their woody stems are seldom injured, they put out new branches below; and if in very severe win-

ters the stems are destroyed, the roots remain, and put out new ones in the following summer.

In the raising of these plants by the roots, some of the strongest should be separated from the old plant, and left in the ground to send up new shoots; or pieces may be cut off and planted in pots, and then plunged in a moderate hot-bed, by which they readily send up shoots and form plants.

In the second and third sorts the seeds should always be sown in the autumn as soon as they become ripe, as there is much loss of time by sowing them in the spring, from their seldom coming up the same year. In the following autumn, when their leaves decay, the plants may be taken up by the roots, and planted out where they are to remain.

They are likewise capable of being raised by dividing the roots, which should be performed at the same period as the above, the plants being set out at considerable distances.

The general management in all the sorts is only that of keeping them perfectly clean and free from weeds.

The first is a plant of the most ornamental kind, which should have a place in the large borders and clumps of gardens and pleasure-grounds, where they are the most exposed to view. It is deciduous in leaf.

The two last are plants of the herbaceous kind, and from their hardy nature well suited for affording variety in shaded wilderness situations.

ARBOR, a plant of the perennial kind, that rises with a lasting simple ligneous stem or trunk to a considerable height and thickness. It is used to signify a tree in opposition to a shrub. See *Tree* and *Shrub*.

ARBOUR, a small ornamental shady retreat, formed in gardens and pleasure-grounds, with various sorts of trees and shrubs, placed in such a manner as to inclose a certain space, and make a kind of seat or recess for the hot summer season. Places of this kind were formerly much more fashionable and in higher estimation than at present. They are commonly formed of evergreens, as yew, privet, &c. planted very close, having the sides trained erect, six, eight, or ten feet in height, and the tops formed in various shapes over frames or lattice-works of wood or iron for the purpose, having openings of different kinds formed on the sides, the whole being cut or clipped over annually to keep them in proper order, which in many cases and situations have a good effect. They may also be formed of deciduous trees, particularly the elm, and sometimes with the hornbeam, beech, and

time, which must be constantly cut over every summer. The forms of the evergreen as well as deciduous kinds are mostly either square, hexagonal, octagonal or round, and their dimensions generally from ten to fifteen feet in width and height; the tops being mostly either pavilion-, turret-, or dome-shaped, and sometimes terminated by a globe, pyramid, or other figure, formed of the extreme branches. Covered arbours or bowers may be formed very quickly, even in one season, by several sorts of shrubby herbaceous climbing plants; some of which are capable of advancing fifteen or twenty feet in one season. They should, if possible, be erected upon a somewhat rising ground, for the greater advantage of free air and prospect. They are also capable of being formed in the heads of large single trees, particularly elms, where the trunks have divided at the height of ten or twelve feet, into several lesser spreading stems, so as to admit of constructing a small platform between them, cutting down the large boughs, and training the pliable branches archways over lattice-work till those on each side meet; then clipping the sides annually: the tops in this case may either be cut, or permitted to grow up, or the whole suffered to advance in a natural growth. They may likewise be made on the ground in another manner; as by planting some of the tallest-growing flowering shrubs round the inside to form the dimensions, then on the outside of these others of somewhat lesser growth; continuing them in this way for three or four ranges, diminishing gradually in stature from the arbour outwardly, and permitting the whole to take their natural growth; so that at a distance they may assume the appearance of common shrubby clumps. Their bottoms, when on the ground, should be well gravelled, and neat garden-stools or chairs placed in them during the summer season.

ARBUTUS, a genus containing plants of the evergreen, shrubby and ornamental kind. The Strawberry Tree.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a five-parted, obtuse, very small permanent perianthium: the corolla is monopetalous, ovate, and flattish at the base, diaphanous, with a quinquefid mouth: the divisions obtuse, revolute and small: the stamina consist of ten subulate swelling filaments, very slender at the base, affixed to the edge of the base of the corolla, and half the length of it: the antheræ slightly bifid and nodding: the pistillum is a subglobular germ, on a receptacle marked with ten dots: the style cy-

lindric, the length of the corolla: the stigma thickish and obtuse: the pericarpium a roundish five-celled berry: the seeds small and bony.

The species of most importance are: 1. *A. Unedo*, Common Arbutus, or Strawberry Tree; 2. *A. Andrachne*, Oriental Strawberry Tree; 3. *A. Uva Ursi*, Trailing Arbutus, or Bearberry.

The first species, Common Arbutus or Strawberry Tree, rises to the height of twenty or thirty feet in its native situation, but rarely with an upright stem. But with us it is of much humbler growth. It usually puts out branches very near the ground. The leaves keep on all the winter, and are thrust off in the spring by new ones, so that it is always clothed with leaves. The berries have many seeds in them, and are roughened with the tubercles of the seeds.

There are several varieties; as with large oval fruit, with round fruit, with double flowers, with scarlet flowers; there are also the curled-leaved or cut-leaved, the broad-leaved, and the narrow-leaved.

The second species much resembles the first, but the bark is not rough; some of the leaves have no serratures, and the panicle is upright and viscid, which in that is smooth. It grows in its native state to a middle-sized tree, with irregular branches. The leaves are smooth, large, and somewhat like those of the Bay Tree, but not quite so long: the flowers are like those of the Common Arbutus, but growing thinly on the branches: the fruit oval, of the same colour and consistence with the common sort; but the seeds of this are flat, while in that they are pointed and angular. It grows naturally in the East.

In the third species the branches trail upon the ground two or three feet round the root or more. The leaves are alternate, bluntly oval or oblong wedge-shaped, with a net-work of veins underneath, and corresponding wrinkles above, firm and evergreen like those of Box: the flowers grow at the extremities of the branches in small clusters, each supported by a short red foot-stalk: they are of an oval-conical figure, flesh-coloured, or white with a red mouth, and divided into five obtuse, reflex segments at the rim: the berries are round with a depressed umbilicus, smooth and glossy, red when ripe, and of the size of a holly-berry, replete with an austere mealy pulp, in which are five cells containing five angular seeds. It is a shrub very abundant in many parts of the continent, as Sweden, &c.

Culture.—The most usual method of raising these beautiful evergreens is by sowing the seeds; but they are sometimes capable of being raised by cuttings and layers.

In the first of these methods with the first species, the seeds should be collected when perfectly ripe in November, or the following month, and preserved in dry sand till the period of sowing, which may either be in December or the early spring season. The seed should be sown in pots, and lightly covered with mould, then plunged into an old tan hot-bed, and covered by glasses. In this mode the plants will be up in April, when they should be often but sparingly watered, and kept free from weeds.

As the hot season proceeds, the plants should be shaded during the heat of the days; but in warm weather open all night to receive the dew, and only covered in the middle of the day. In this mode the plants become strong the first summer. In the beginning of October they may be shaken out of the pots, and their roots carefully separated, planting them singly in small pots filled with light earth; then plunging the pots into an old bark-bed under a common frame, carefully shading them from the sun in the middle of the day, and giving them water as they require: in this bed the pots should remain during the winter, exposing them to the open air whenever the weather is favourable; but in frosty weather they should be covered, so as to protect them. In the spring following they may be removed to a gentle hot-bed, which requires no other covering but mats. This enables them to make strong shoots early in the summer, by which they become in a better condition to bear the cold of the succeeding winter. In this bed they should continue during the summer, and be well protected in the following winter.

After the plants are become two or three feet in height, shake them out of the pots, and plant them in the open ground in the places where they are to remain, which should be done in April, that they may have taken good root before the winter, which is apt to injure them when newly planted out; and as all the earth about their roots is thus preserved, they will succeed better.

The plants are tolerably hardy, and seldom hurt, except in extreme hard winters, which often destroy the young tender branches, but rarely the roots.

They delight in a generous but not too moist soil, as when planted in dry ground they seldom produce much fruit: the flowers coming forth in autumn, when the winter proves severe, they are generally destroyed; consequently, to obtain fruit, they should be placed in warm situations, and where the ground is not naturally moist; a good quantity of loam and rotten neat's dung should be laid about their roots, and in dry springs they should be plentifully watered.

The most proper season for transplanting is

September, at which time the blossoms are beginning to appear; and when dry at that season, and they are kept moist, they very soon take root; but towards November their roots should be well covered to keep out the frost. In performing this business the balls of earth round their roots should be preserved.

In raising the second species the seeds must be procured from abroad, and the plants be left longer in the pots, as three or four years, or until they are become perfectly woody; and when put out, warm situations be chosen for the purpose, where the soil is dry, as the plants do not succeed well where the land is too moist.

The third species should be raised in pots filled with bog earth, which should be set out in moist watery situations.

In propagating them by the second method, or that of cuttings, they should be made from the young shoots, and be planted in pots in the spring or summer months, plunging them into a good hot-bed of tan or dung till they have stricken root.

In the layer mode of propagation the young shoots should be chosen, as they otherwise seldom take root in less than two years.

In grafting them, stocks of any of the varieties may be had recourse to.

In continuing the double-blossomed and scarlet varieties, some of these last methods must always be employed.

These are some of the most ornamental plants of the evergreen kind for shrubberies and pleasure-grounds that we possess. The first sort and varieties sometimes rise to a considerable height, as ten or fifteen feet. They are now found in most plantations, and in the months of October and November, which is the season when they are in flower, and the fruit of the former year is ripe, as it is a whole year in growing to perfection; they are very ornamental. When there is plenty both of fruit and flowers upon the trees, they indeed make a handsome appearance, as most other plants are past their beauty. The trees which have large oval fruit make the greatest figure; the flowers of this being larger and oblong. The variety with double flowers is a curiosity: but the flowers, having only two rows of petals, make no great appearance, nor do the trees produce fruit in any quantity; the other is therefore preferable. That with red flowers makes a pretty variety, when intermixed with the other, for the outsides of shrubberies, as they are of a fine red colour at their first appearance, and afterwards change to purple before they fall off. The fruit in this is the same as in the common sort.

As the leaves of the *Andrachne* are larger

than in the other sorts, they have always a better effect as evergreens.

ARCTOTIS, a genus comprising herbaceous plants and shrubby perennials of the exotic kind for the green-house.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Corymbiferae*.

The characters are: that the calyx is common, roundish, imbricate; lower scales more lax, subulate; middle ovate; inmost oblong, scariose, rounded, and concave at the end: the corolla compound, radiate; corollules hermaphrodite; very many in the disk; females ligulate, near twenty, longer than the diameter of the disk proper, of the hermaphrodites funnel-shaped; border quinquefid; ends reflex, equal; of the females ligulate, lanceolate, very finely three-toothed; tube very short: the stamina of the hermaphrodites consist of five capillary filaments, very short: the anthera cylindric, tubular, five-toothed, the length of the corolla: the pistillum of the hermaphrodites is a germ scarcely visible: the style cylindric, a little longer than the corolla; the stigma simple; of the females the germ ovate, four-cornered, villose, crowned with its proper calycle: the style filiform: the stigmas ovate, oblong, thickish, erect; no pericarpium: the calyx unchanged; no seeds in the hermaphrodites; in the females solitary, roundish, villose, crowned with a calycle, usually of five leaves: leaflets ovate, spreading: the receptacle villose, or chaffy and flatish.

The species of most importance are: 1. *A. calendulacea*, Marigold-flowered Arctotis; 2. *A. dentata*, Five-leaved Arctotis; 3. *A. acaulis*, Dwarf Arctotis; 4. *A. tenuifolia*, Small-leaved Arctotis; 5. *A. grandiflora*, Great-flowered Arctotis; 6. *A. plantaginea*, Plantain-leaved Arctotis; 7. *A. angustifolia*, Narrow-leaved Arctotis; 8. *A. aspera*, Rough-leaved Arctotis; 9. *A. paradoxa*, Chamomile-leaved Arctotis.

The first has the peduncles villose, beset with red bristles, before and after flowering time nodding: the ray yellow, purplish underneath, twisted during the night: the corollules of the disk black on the outside, and with black antheræ: the outer scales of the calyx spreading, subulate, very short, hispid. It is annual.

There are several varieties of this species.

The second species has the stem branching: the leaves alternate, somewhat rigid and villose: the pinnae recurved: the peduncles long, one-flowered: the flowers small, with the ray purple beneath. It is annual, and flowers in July.

The third is a low plant, the flower-stem rarely exceeding six inches in height; but the

flowers, which are yellow, are large and fine: they come out in April, and continue to July.

The fourth species has the stems herbaceous and few, not much branched: the leaves filiform or linear, rather fleshy and naked: the peduncles very long, solitary, naked and filiform: the bractea minute and filiform: the calyx imbricate, scariose above: the ray yellow. It is perennial.

The fifth has the ray very large: the petals are straw-coloured, with a tinge of red underneath, yellowish above near the base, with a very dark purple mouth. It is biennial, and flowers from March to May.

The sixth species has the leaves tomentose underneath: the disk barren. It is perennial, and flowers from June to August.

The seventh has the florets of the disk barren, and the receptacle very woolly.

There are varieties of it with leaves scarcely broader than those of Lavender.

The eighth has the stem stiff, perennial and villose, with purple streaks: the leaves white underneath: the corollas of the ray yellow, with red streaks beneath and fertile: those of the disk barren.

There is a variety of this with handsome orange-coloured flowers, displaying themselves from July to September.

In the ninth species the chaffs are elongate, coloured, almost the length of the ray; whence the flower has the appearance of a double one.

Culture.—All the annual sorts are capable of being raised by sowing the seeds in the spring in pots of light fresh earth, plunging them into a very moderate hot-bed. The plants, when well rooted, should be gradually inured to the free air. When the season is dry, water will be frequently necessary. They likewise require to be frequently removed into other pots. As they never grow healthy if kept too much in the house, when the weather is suitable they should always be exposed to the open air. They may also be propagated by slips from the roots.

The shrubby sorts are propagated by cuttings from the young shoots, which should be planted in pots or beds of light fresh mould in the summer months, being occasionally watered and shaded until they become perfectly rooted, which is generally in six or eight weeks; when they must be carefully removed into other separate pots, and preserved in the open air as long as the weather permits, being shaded from the sun, and watered when necessary. During the winter the protection of a very dry green-house will be requisite for all the sorts; but these should be placed as much exposed to the mild air as pos-

sible, without being shaded by other plants; which induces mouldiness. These, like the annual sorts, require to be removed two or three times in the summer into other pots, to prevent their shooting their roots through the holes, and being injured when taken up.

From their being easily destroyed in the winter, it is necessary to raise supplies annually from cuttings in the summer season.

And as many of the plants rise to the height of three or four feet or more, and send forth many branches, they require occasional pruning.

As they flower both in the summer and winter seasons, they are curious, and afford a pleasing variety in the green-house or stove.

ARDUINA, a genus comprising a plant of the evergreen shrubby kind for the green-house. The Cape Buckthorn.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortice*.

The characters of which are: that the calyx is a five-parted, erect, acute, small, permanent perianthium: the corolla one-petalled, funnel-shaped: the tube cylindrical, a little curved inwards at top: the border five-parted, acute and spreading: the stamina consist of five simple filaments, shorter than the tube, and inserted into the lower part of it: the anthers are oblong, within the throat of the corolla: the pistillum is a germ superior and ovate: the style filiform, the length of the tube, and the stigma bifid, thickish: the pericarpium is a globular-oval, two-celled berry: the seeds solitary, oblong and hard.

There is only one species, *A. bispinosa*, Two-spined Arduina.

It is a low shrubby plant, seldom rising above four or five feet in height. It sends out spreading branches in pairs from top to bottom, and they are covered with a dark-green bark, and armed with short strong thorns, which come out by pairs; and sometimes there are double pairs upon the same foot-stalks, which are situated just below the leaves; and where there are four, two point upwards, and the other two downwards. The leaves are heart-shaped, not much larger than those of the Box Tree, or about an inch long, and three-quarters of an inch broad at their base, of the same consistence and colour, terminating in acute points; they are placed opposite in pairs pretty close together, and continue green all the year. The flowers come out in clusters at the ends of the branches, upon short slender peduncles, each supporting five or six small white flowers, having an agreeable odour. They commonly appear in July and August, and are seldom succeeded by

seeds in this climate. The berries do not ripen till the following spring, and are then of a deep-red colour. It is a native of the Cape of Good Hope.

Culture.—This plant is capable of being increased by cuttings and layers of the young shoots, the former planted out in the summer season in pots, plunged in moderate hot-beds, and shaded from the sun. After they have taken root, they should be removed into small pots, and placed in the shade till they have taken fresh root: they may then be removed to a sheltered situation till autumn, when they must be put into a greenhouse, or under a hot-bed frame, as they are too tender to live in the open air.

This is an elegant plant; but requires to be constantly kept in pots, in order to be removed into the shelter of the green-house during severe weather.

ARECA, a genus comprising a tree of the exotic Palm kind. The Fausel-nut Palm, or Cabbage Tree.

It belongs to the class and order *Monœcia Enneandria*, and ranks in the natural order of *Palmæ*.

The characters are: that in the male flowers the calyx is a bivalve spathe, having the spadix branched: proper perianthium three-leaved: the corolla consists of three acuminate, rigid petals: the stamina consist of nine filaments, the three outer longer than the rest: female flowers in the same spathe: the calyx is a common spathe with the males: proper perianthium three-leaved: the corolla three acuminate rigid petals: the pericarpium a subovate, fibrose berry, surrounded at the base with the imbricate calyx: the seed is ovate.

The species is *A. oleracea*, or Cabbage Tree.

In this the sheaths of the leaves are very close, and form the green top of the trunk, a foot and half in length. Below this come out green shining spathes, which fall to the ground when the very branching spadix bursts forth. The calyx of the flower is one-leaved, cut half way into three segments. The fruits are oblong, obtuse berries, slightly bent, of a blue purple colour, succulent, scarcely fibrose, the size of a middling olive: the pulp dries away, and becomes a brittle, wrinkled bark. The nut or stone is oblong, smoothish, rather acute at the base, membranaceous, brittle, thin, whitish-brown frequently with a shade of red. The kernel is oblong, cartilaginous, very hard, and has a cavity in the middle of a small fissure. In its native state the inhabitants cut off the green top of the trunk, take out the white heart, and make use of it as an article of food. But in

this climate, it is chiefly kept in the stoves for variety.

Culture.—The propagation in this tree is effected by sowing the seeds in pots of light good earth as soon as procured from abroad, plunging them in moderate hot-beds of dung or bark in the stove, moderate waterings being given. After the plants are risen a few inches, they should be removed into separate small pots, and replaced in the hot-beds, watering them as necessary. As they advance in growth, they must be removed into larger pots.

It is a plant that deserves a place in the stove, for its singularity and the beauty of its foliage.

ARGEMONE, a genus comprehending a plant of the annual kind: The Prickly Poppy.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhœadaceæ*.

The characters of which are: that the calyx is a three-leaved, roundish perianth: the leaflets roundish with a point, concave and caducous: the corolla consists of six roundish petals, from erect spreading, larger than the calyx: the stamina consist of numerous filiform filaments, the length of the calyx: the anthers are oblong and erect: the pistillum is an ovate, five-angled germ: there is no style: the stigma thickish, obtuse, reflex, quinquefid and permanent: the pericarpium is an ovate, five-angled, one-celled, half-valved capsule: the seeds numerous and very small: the receptacles linear, fastened to the angles of the pericarpium, but not gaping: the half-valved capsule distinguishes this from the *Papaver*.

There is only one species cultivated in the garden: *A. Mexicana*.

It is an annual plant, rising to the height of two or three feet, with stems armed with prickles: leaves sinuate or jagged, soft, shining, stem-clasping, the points of the jags ending in sharp yellow spines; on the upper side there are milky veins, as in Our Lady's Thistle; on the under, small prickles along the midrib and veins: the flowers are solitary at the ends of the stem and branches: the corolla is yellow, with from four to six petals: the calyx consists of two or three prickly leaves; the stigma is capitate, small, with five notches: the capsule superior, having five or six ribs from top to bottom, and between the ribs armed with bristle-shaped spines; at the top is the flattened stigma: the seeds are very numerous, round, black, rough, with a compressed scar on one side: the valves of the capsule vary in number, as well as the petals, from four to six. It is a native of Mexico, and flowers in July and August.

Culture.—As this is an annual plant, it may be easily raised by sowing the seeds thinly in spots of light earth in the places where the plants are to remain. As the plants shed their seeds, they mostly continue for several years after they have been once introduced.

ARISTOLOCHIA, a genus comprehending various plants of the herbaceous and exotic kinds.

It belongs to the class and order *Gynandria Hexandria*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that it has no calyx: the corolla is monopetalous, tubulous, irregular: the base swelling, subglobular, torulose: the tube oblong, hexagon-cylindric: limb dilated, and extended below into a long tongue: the stamina have no filaments: the antheræ six, fastened at bottom to the stigmas, and four-celled: the pistillum is an oblong, inferior, angular germ: style scarcely any: the stigma subglobular, six-parted, and concave: the pericarpium is a large, six-angled, six-celled capsule: the seeds several, depressed and incumbent: the fruit varies in figure, being in some species roundish, in others long.

The species are numerous; but those employed for ornament in gardens are chiefly: 1. *A. erecta*, Upright Birthwort; 2. *A. Siphon*, Broad-leaved Birthwort; 3. *A. arborescens*, Tree Birthwort; 4. *A. sempervirens*, Evergreen Birthwort; 5. *A. pistolochia*, Ramose-stalked Birthwort.

The first rises with an upright stalk to the height of three feet: the leaves are long, narrow, hairy, growing close to the branches, having scarce any foot-stalks: the flowers come out singly from the axils, are near four inches long, of a dark purple colour, and grow erect; these are succeeded by slender vessels, about one inch long, filled with flat heart-shaped seeds. It is a native of Vera Cruz in New Spain.

The second species is a tall twining shrub: the root woody, sparingly branched, fragrant, having the smell of camphor: the stems are wrinkled, gray and fragrant: the branches and twigs alternate, sarmentose, obscurely flexuose, round, even, green, becoming gray: the leaves spreading, remote, roundish, sinuate-cordate, acuminate or scarcely acute, entire, villose and paler beneath, veined: the nerves prominent on the lower surface, flat, in length, and in breadth six inches: the petioles shorter than the leaves, semicylindric, grooved above, somewhat villose: peduncles lateral, at the joints below the leaf, pendulous, longer than the petiole, one or two together, one-flowered: the bracte embracing the middle of the peduncle, decurrent a little,

leafy, roundish, cordate, villose beneath, spreading, caducous: the corolla purplish-brown, one inch and a half long, ten or twelve lines broad: tube-shaped like a siphon, marked with lines, bellying at the base, in the middle broader and flatted a little, at the end narrow and cylindrical: border marked with brown lines, spreading, inclined, waved, trifid, the clefts rounded and slightly acuminate: there are no filaments: antheræ six, fastened to the stigma by pairs beneath, ovate, two-celled and yellow: the germ is a hexangular column, finely villose: stigma at the bottom of the corolla, very large, roundish, three-valved, furnished with three points: capsule cylindrical, with a blunt point, six-nerved, six-valved, splitting into six parts from the very peduncle: the cells covered with a transparent membrane forming a sort of common aril for the seeds. It is three or four inches long, and one inch broad: the seeds numerous, obovate, flat, rufous, incumbent; fastened to each other by pairs, only one of which is fixed to the partition. It is distinguished by the form of its flower, which is bent like a siphon; by the trifid, flat border; by the very large bracte placed on the middle of the peduncle; by the disposition of the seeds, and the aril being common to all the seeds of each cell. It is a native of North America, and flowers in June and July.

The third species rises about two feet in height: the branches are not very woody, but are strong enough to support themselves: the flowers come out singly at the axils: the branches grow erect, and are perennial. It is a native of North America.

In the fourth the roots are many, slender and odorous: the stems many, trailing, slender, a foot or eighteen inches in length, angular, striated, branched, tough, and pliable, dark green, spreading on the ground: the leaves nerved, very dark-coloured, evergreen, on long petioles: the flowers axillary, crooked, longer than the leaves, of a dark purple colour on the outside, but yellowish within: the fruits like those of Long-rooted Birthwort, but smaller. It is a native of the island of Crete, or Candia. It flowers in May and June.

The fifth has the roots round and numerous: the stems angular, branching, seldom rising to a foot in height, and scarcely able to support themselves: a small heart-shaped bracte sits close at the base of the peduncle: the flower is small, the lip is bent inwards: the tube and beginning of the petal are yellow, the broader end blood-coloured: the fruit is petioled, ovate and grooved. It is a native of the south of France, &c.

Culture.—The two first sorts may be propa-

gated by sowing the seeds, which are often brought from abroad in pots of light earth in the autumn, as in September or the following month, plunging them in an old tan-bed, or putting them under a good garden-frame, in order to preserve them from the effects of frost during the winter, and in the spring bringing them forward by the assistance of a moderate hot-bed, gradually inuring them in fine weather as much as possible to the open air, water being occasionally given. In the following winter they will require to be placed under frames, or in the green-house. In the second spring some of them may be planted out in warm and rather shaded situations, and others into pots, to have protection a third winter when necessary, in order to their being planted in the open ground the following spring. They may also be readily increased by the creeping roots, either in the spring or autumnal season.

The three latter species are capable of being raised, either by sowing the seeds, which are received from abroad, in pots of fresh light earth in March, forwarding them by means of moderate hot-beds till they have attained some growth, or by planting slips from the roots, or cuttings in the spring. But in whichever method they are raised they must be potted in the autumn, and placed under the protection of a green-house or good garden-frame during the winter seasons afterwards, as much free air as possible being admitted in mild weather.

The third species is hardy enough to be planted out in the open ground in very warm situations, care being taken to guard it from the frosts in the winter.

Some of the sorts require the support of sticks, in order to give them an upright growth.

ARNICA, a genus comprising different herbaceous plants of the *Leopard's-lane* kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common imbricate, shorter than the ray of the corolla: the leaflets lanceolate, the length of the calyx, and erect: the corolla compound radiate: corollules hermaphrodite in the disk, and very numerous: the females in the ray about twenty: proper of the hermaphrodite tubular, erect, five-cleft, equal: female lanceolate, very long, three-toothed and spreading: the stamina to the hermaphrodites consist of very short filaments; anthera cylindric: to the females filaments subulate, erect: anthera none: the pistillum consists of an oblong germ: style simple, the length of the stamina: stigma bifid: no pericarpium: the

calyx unchanged: the seeds solitary and oblong: down simple; in the hermaphrodites pubescent and long: the receptacle naked.

The species are numerous; but those cultivated are chiefly *A. montana*, Mountain Arnica; 2. *A. scorpioides*, Alternate-leaved Arnica; 3. *A. crocea*, Saffron-flowered Arnica.

The first has the root woody, blackish, superficial, appearing as if cut off, having bunches of long fibres, perennial: the stem a foot or a foot and half high, but not more than six inches in alpine situations, obscurely angular, simple, terminated by three (sometimes only two or even one) upright peduncles, each bearing one flower, two inches in diameter, of a deep yellow colour, tinged with brown or russet and orange: the calyx is dirty green, cylindric and hairy, composed of fifteen or sixteen scales; in the ray about fourteen ligulate florets, twice as long as the calyx, a line or more in breadth, striated, three-toothed, having hairs at their base: the seeds oblong, blackish, roughish and hairy, crowned with a straw-coloured or russet-coloured down: the receptacle with deep excavations, on the edges of which are very small bristles, which make the whole seem a little hairy.

The second species has roots much jointed, dividing into many irregular fleshy offsets, which are variously contorted: the stems several, from six or eight inches to a foot in height, terminated by one handsome flower, of a deep yellow colour, two inches over: the root-leaves almost round or oval, deeply serrate, terminating suddenly in a short point, and placed on long petioles: the stem-leaves few, almost sessile: all soft, shaggy, and viscid: the calyx shaggy, open; the outer scales longer and wider: the ray of the corolla very open: the seeds a little hairy, short, crowned with an egret. It is a native of Switzerland.

The third has the crown of the root woolly: the root-leaves petioled, an inch and half or two inches long and an inch broad, rigid, smooth on the upper surface, generally oval, but sometimes heart-shaped: the scales one-flowered, with a few linear bractæ: the florets of the ray are furnished with stamina. It is a native of the Cape.

Culture.—These plants are capable of being propagated by sowing the seeds in the early autumn in moist and rather shady situations. They often rise from the scattered seed. They may also be increased by parting the roots, and planting them out in similar situations at the same season, as immediately after the decay of the stems.

The third sort requires to be protected in pots

under a good garden-frame, or in the dry stove, and must have the same management as other plants of the tender exotic kind.

AROMATIC PLANTS are such as possess a fragrant aromatic flavour combined with an odoriferous smell in many of the sorts: some of them are employed as savoury sweet-herbs for various culinary purposes. The principal of them consist of under-shrubby and herbaceous perennials, and of annuals and biennials. Of the first kinds are thyme, sage, winter-savory, pot-marjoram, winter sweet marjoram, hyssop, rue, rosemary, fennel and lavender. These continue furnished with leaves in most cases all the year; but the herbaceous sorts renew their stalks and some of the other parts annually in spring and summer, as common mint, penny-royal, baum, fennel, tansey, tarragon, peppermint, and lovage. Of the latter kinds are sweet-marjoram, summer-savory, chervil, dill, marygold, basil, parsley, caraway, anise, and angelica. And among the perennial kinds, the principal culinary or pot-herb aromatics are thyme, sage, winter-savory, marjorams, mint, penny-royal, tansey, tarragon and fennel.

All of these aromatic herbs, except the basil, are mostly of hardy growth, so as to succeed in any common soil or situation; the perennial sorts continuing several years in the same plants, among which some are durable, both in root and top, and remain green for use all the year, as thyme, sage, winter-savory, marjoram, hyssop, rue, rosemary, &c.; while others are perennial only in root, and annual in stalk, as the mints, penny-royal, tansey, tarragon, and fennel, furnishing their respective produce for use, only in the spring, summer, and autumn.

The perennial aromatics are easily raised, either by slips, offsets, parting the roots, or by seed; and may be planted in spring, summer, or autumn, in beds or borders at from six to ten or twelve inches asunder; but the annual and biennial kinds continuing in the former only one season, and in the latter only till the second year, must be raised every year or two, according to the kind, from seed in the spring in any common earth in the open ground, except the basil, which being tender requires a hot-bed, in order to be transplanted in May and June: most of the others generally remain where sown in the natural ground, but may be occasionally transplanted, the sweet-majoram and summer-savory in June, &c.; and likewise the angelica, as being of large growth, in summer.

As some of these only afford their useful parts at particular seasons, as mint, baum, penny-royal, tarragon, sweet-marjoram, &c., they should be cut and preserved at such times for

winter use, as about July and August; but for the marygold, chamomile flowers, and those of lavender, as well as sage tops, marjoram, hyssop, and such like, which often stand the winter, autumn may be better, as they will then be ready, in case of a severe winter. Parsley generally furnishes proper supplies of green leaves all the year; basil and dill only in summer; chervil and coriander, principally in summer and autumn, of the spring and summer sowings; or if some of each be also sown in August, they will continue green all winter: but the coriander requires a little protection in that season; and the caraway, anise, and angelica, continue only in summer and autumn.

In the culture of these plants, the perennial sorts, being planted in beds or borders, continue there, as just observed, several years, and only require to be kept clean from weeds in summer and autumn, and to be cut down, and the decayed stalks removed at the latter season; and in spring to give the beds, &c. a neat dressing, by clearing them of all weeds and litter, and then loosening the ground a little between the plants; and in some of the close running kinds, as the mints, &c., to spread some earth thinly over the general surface about them. When any particular sorts appear in a declining state, fresh plantations should be made in the proper season.

As to the annual sorts, they only require to be kept clean from weeds during their growth and continuance, and that fresh supplies be raised every year from seed.

ARTEMISIA, a genus comprising many perennial herbaceous and shrubby plants of the Mugwort, Wormwood, and Southernwood kinds.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Nucamentaceæ*.

The characters of which are: that the calyx is common roundish and imbricate: scales rounded and converging: the corolla compound: corollules hermaphrodite, tubular, several, in the disk: females almost naked, in the circumference: proper of the hermaphrodite funnel-shaped: border five-cleft: the stamina in the hermaphrodites have capillary filaments, very short: the anthera cylindric, tubular, five-toothed: the pistillum in the hermaphrodites a small germ: style filiform, the length of the stamina: stigma bifid and revolute: in the females the germ very small: style filiform, longer than in the hermaphrodites: the stigma similar: no pericarpium: the calyx scarcely changed: the seeds solitary and naked: the receptacle flat, naked, or villose.

The species most cultivated are: 1. *A. Absin-*

thium, Common Wormwood; 2. *A. arborescens*, Narrow-leaved Tree Wormwood; 3. *A. argentea*, Broad-leaved Tree Wormwood; 4. *A. Abrotanum*, Southernwood; 5. *A. Santonica*, Tartarian Southernwood; 6. *A. Dracunculis*, Tarragon.

The first has a perennial branching root: the stems from a foot and half to two feet and upwards in height, upright, grooved, whitish with a very short nap, especially towards the top, branched, the branches making half a right angle with the stem: the leaves are petioled, pinnate-multifid, pinnas alternate (five to seven), the subdivisions, especially of the lower leaves, wide, irregular and unequal, the extreme segments blunt; they are tomentose on both sides, and very soft; the young ones silvery white, but as they advance the whiteness wears off till they become green to the eye on the upper surface: the lower leaves are on very long angular petioles, deeply channelled above: the leaflets are decurrent along the partial foot-stalks: on the stem-leaves they are narrower, and retain their whiteness longer: the uppermost leaves among the flowers are trifid or even simple, sessile and bluntly lanceolate: the flowers are in racemes, continued half the length of the stem, each from the axil of a leaf, directed one way, nodding: the calyx hemispherical, with scales bluntly ovate, very tomentose, having membranaceous edges: florets fifty and upwards in a single flower, dusky yellow, scarcely longer than the calyx; with about fifteen naked female florets in the circumference: the seeds are small, ovate, oblong, pale and naked: the receptacle flattish, covered with white silky villose hairs, shorter than the calyx. It flowers from July to October.

The second species rises with a woody stalk six or seven feet high, sending out many woody branches, with leaves somewhat like those of Common Wormwood, but more finely divided, and much whiter: the branches are terminated by spikes of globular flowers in the autumn, but are seldom followed by seeds here. It is a native of the Levant.

In the third the whole plant is of a silvery colour: the receptacle is villose. It is a native of Madeira, and flowers in June and July.

The fourth species is an under-shrub seldom rising more than three or four feet high: the leaves are alternate, petioled, multifid; leaflets linear, very narrow, pale green, tomentose-scabrous; less divided towards the top, till they become trifid and even linear next the flowers; which come forth in linear, upright racemes, or spikes, from the axils at the extremities of the branches, on one-flowered peduncles; they are small, abundant, nodding, and yellow; but

rarely open in this climate. It is a native of Italy.

The fifth is upright: the stem panicled, rather hoary: the lower leaves pinnate-multifid, linear, hoary: branches wand-like: the racemes or spikes alternate, recurved, with the flowers all directed the same way; the pedicels with here and there linear, bluntish, recurved leaves: the flowers solitary and cylindric. In the fruiting plant all the stems are upright, and lose their hoariness: the leaves on the branches are very small, linear and undivided: the receptacle naked. It is a native of Persia, and flowers from September to November.

The sixth species has the root perennial: the stem stiff, smooth, branching, from a foot to two feet in height: the leaves petioled and green on both sides: two or three peduncles from the axils, pressed to the branch: the flowers are in a kind of spike, all directed the same way: calyxes roundish, with oblong, smooth, imbricate scales: florets yellow, small: hermaphrodites twelve; females six: the seeds reddish-brown, streaked and naked: the receptacle is flat, glutinous, honeycombed and naked. It is a native of Siberia, and flowers in August.

Culture.—These plants may be propagated with facility in different ways, according to the different sorts. The first may be easily raised, either from the seeds sown in the autumn, or by suffering them to scatter. It may likewise be increased by parting the roots, or from slips planted out in the summer season.

The second and third species may be increased from cuttings, by planting them in shaded situations in the summer season, water being frequently given them until they have stricken root. In autumn the young plants should be removed into pots, and have the protection of a garden-frame during the winter. In mild winters they sometimes succeed on a warm border.

The fourth species is readily increased by slips or cuttings planted out in shady places in the early spring months, water being occasionally given when the weather is dry till the plants have taken root. In the autumn the plants should be removed into pots, or the places where they are to remain. The fifth sort may be managed in the same way; but should have a more dry soil and sheltered situation, and a few plants potted to be placed under a frame during the winter.

The last sort is readily propagated by its creeping roots, or by planting the young shoots in April or May in the same manner as in mint, water being freely given when the season is dry. This is a hardy perennial, used in salads for its

warm stomachic property. The leaves may likewise be employed as a pickle.

Some of these plants may be made use of, as being ornamental, in clumps and borders for variety, and the tree kinds may have a place in the green-house.

ARTICHOKE. See *CYNARA*.

ARTICHOKE, JERUSALEM. See *HELI-ANTHUS*.

ARTOCARPUS, a genus comprehending trees of the tall-growing exotic kind.

It belongs to the class and order *Monæcia Monandria*, and ranks in the natural order of *Urticæ*.

The characters are: that in the male flowers there is no calyx: the amentum is cylindrical, all covered with florets: the corolla to each two petals oblong, concave, blunt and villose: the stamina consist of a single filament within each corolla, filiform, the length of the corolla: the anthera oblong: female flowers on the same tree, neither calyx nor corolla: the pistillum consists of very many germs, connected into a globe, hexangular: the style to each filiform: the stigma single, or two, capillary and revolute: the pericarpium an ovate-globular fruit, compound, muricate: the seeds for each germ solitary, oblong, and covered with a pulpy aril, placed on an ovate receptacle.

The species are: 1. *A. incisa*, Bread-fruit Tree; 2. *A. integrifolia*, Indian Jaca Tree.

The first is described in Cook's Voyages, as being, in its native situation, a tree about the size of a middling oak: its leaves are frequently a foot and half long, oblong, deeply sinuated like those of the fig-tree, which they resemble in consistence and colour, and in exuding a milky juice when broken. The fruit is the size and shape of a child's head, and the surface is reticulated not much unlike a truffle: it is covered with a thin skin, and has a core about as big as the handle of a small knife; the eatable part lies between the skin and the core: it is as white as snow, and somewhat of the consistence of new bread. It must be roasted before it is eaten, being first divided into three or four parts: its taste is insipid, with a slight sweetness somewhat resembling that of the crumb of wheaten bread mixed with Jerusalem Artichoke. It is a native of the South Sea Islands, and has been lately introduced into the West Indies.

It is useful not only for food, but also for clothing; for the bark is stripped off the suckers, and formed into a kind of cloth.

The principal varieties of this tree are, that in which the fruit is destitute of seeds, and that in which they are found. Martyn observes, that

the latter may be considered as the tree in a wild state; and that the want of seeds is probably owing to cultivation. The natives of Otaheite reckon at least eight varieties of that without stones, differing in the form of the leaf and fruit. One of these they name *Uru* or *Eoroo*: this has a globular, smooth, even fruit, and is the most common. A second, named *Maira*, has an oval, smooth fruit, with the leaves more deeply cut. A third, called *Patea*, has the fruit oblong and rugged, as it were scaly. A fourth, *Tatarra*, has an oval fruit, with mammillary germs mucicated by the permanent style. The same writer remarks, that probably by extending the culture to distant countries we shall hereafter find the varieties much increased.

The parts of fructification in those trees which bear fruit without stones are said to be defective. The amentum never expands; the styles are likewise deficient.

In the former variety the fruit contains a considerable quantity of seeds, almost as large as Chestnuts, oblong, somewhat angular, produced into a point at each end, separated by several little membranes or coats, formed by the abortion of some of the germs: they are attached to a fleshy and very considerable placenta, which occupies the centre; are farinaceous, like the Chestnut, and eaten in some places by the savage inhabitants, either boiled, or roasted in embers. It will easily be supposed that this fruit, abounding less in pulp, and being both more fibrous and less juicy than that which has no seeds, must be much inferior, as an article of food: and accordingly, before the discovery of the South Sea Islands the Bread-fruit had not acquired that degree of reputation which it is now found to deserve.

The second species is about the same size with the foregoing, or larger: branches alternate, spreading: the twigs hirsute with long stiff hairs: the leaves alternate, petioled, ovate-oblong, blunt with a blunt point, obscurely serrate, undivided, nerved; bright green and very smooth on the upper surface, paler beneath and hirsute with stiff hairs, spreading, a span in length: the younger leaves are evidently toothed, but the teeth disappear afterwards: sometimes a leaf or two may be gashed: the petiole is somewhat triangular, smooth, an inch in length: stipules as in the foregoing: the flowers male and female distinct on the same stem or branch: the peduncle either simple or branched, pendulous, an inch thick, and a foot long: the pedicels three, five, or more, the length and thickness of a finger: the fruit

weighs thirty pounds and upwards: it has within it frequently from two to three hundred seeds, three or four times as big as almonds; they are ovate-oblong, blunt at one end, sharp at the other, and a little flattened on the sides. It is a native of the East Indies.

The two species cannot be distinguished with certainty, either by the form of the leaves or the situation of the fruit; for the leaves in this are sometimes lobed, as in that; and the situation of the fruit varies with the age of the tree, being first borne on the branches, then on the trunk, and finally on the roots. When cultivated here their growth is much restricted.

Culture.—In those varieties which bear seeds, each of the species may be propagated either by seeds, suckers, or layers. They may be sown in a pot of rich earth, and plunged in the bark-bed. Those which have no seed in the fruit may be increased from suckers, in which they abound very much, or by layers. In hot climates they succeed best in a rich soil; for though they will grow in an indifferent one, yet they by no means arrive at that magnitude, nor is their fruit so well flavoured, as when they are planted in a good one. Where the suckers are made use of, they should be taken off in the spring, and planted in pots in the stove. If the layer mode be employed, the young shoots should be laid down in the spring or summer, which may be taken off in the following spring, and placed in pots in the stove. The management is afterwards the same as in other exotic trees.

ARUM, a genus comprehending plants of the herbaceous, perennial, and exotic kinds.—The Cuckow-Pint.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Piperitæ*.

The characters of which are: that there are male and female flowers on the same spadix, being closely set together between a double row of threads: the calyx is a one-leafed spathe, very large, oblong, and convolute at the base, converging at the top, the belly compressed and coloured within: the spadix club-shaped, quite simple, a little shorter than the spathe, coloured and fenced at the bottom with germs, shrivelling above them; no proper perianthium; no corolla: the nectaries are thick at the base, ending in threads or tendrils, in two rows, issuing from the middle of the spadix: the stamina have no filaments: the antheræ are sessile and four-cornered: the female flowers are on the lower part of the spadix, close to each other: the calyx being a common spathe and spadix, as in the males; no proper perianthium; no corolla: the pistillum

is an ovate germ; no style: the stigma bearded, with villous hairs: the pericarpium is a globose villous-celled berry: the seeds several and roundish.

The species chiefly cultivated are: 1. *A. Italicum*, Italian Arum; 2. *A. Arisarum*, Broad-leaved Arum, or Friars Cawl; 3. *A. Dracunculus*, Long-sheathed Arum, or Common Dragon; 4. *A. Dracontium*, Short-sheathed Arum, or Green Dragon; 5. *A. Colocasias*, Egyptian Arum; 6. *A. trilobatum*, Three-lobed Indian Arum; 7. *A. bicolorum*, Two-coloured Arum; 8. *A. arborescens*, Tree Arum; 9. *A. seguinum*, Dumb-cane Arum.

The first, according to Martyn, has the stem five feet high, as thick as the human arm, usually upright: the leaves very large, slightly acuminate, with many transverse, parallel ribs; on long, awl-shaped, erect, stem-clasping petioles: the spathes axillary, small, acute, straight and convolute: the spadix awl-shaped, erect; with the female florets inserted at the base: the berries roundish, pale and small. It is a native of the East Indies.

The second species has the spathe entire above, and bent in a little; below it is also entire, and not convolute: the root is oblong and thick; the height about a foot and half: the leaves are sharpish; spathe shorter than the leaves: the spadix curved, and the berries red, with one seed in each. It is a native of the south of France, &c.

The third sort has a large, tuberous, fleshy root, which in the spring puts up a straight stalk about three feet high, spotted like the belly of a snake; at the top it spreads out into leaves, which are cut into several narrow segments almost to the bottom: at the top of the stalk the flower is produced, which is in shape like the common Arum, having a very long spathe of a dark purple colour, standing erect, with a large spadix of the same colour, so that when it is in flower it makes no unpleasing appearance. It is a native of the southern parts of Europe.

The fourth species grows about eight or nine inches high: the root is roundish, solid, white within and without, smooth: the leaves are petioled, upright, smaller than those of the foregoing: the leaflets broad-lanceolate, and commonly in threes: the spadix awl-shaped, slender, longer than both spathe and leaves. It is a native of America, and flowers in June.

The fifth has a tuberous, thick, large, oblong root, rounded at the base: the leaves are thick, smooth, ash-coloured, in form and size resembling those of the Water-Lily, having thick ribs running obliquely to the edge: the petioles

are thick, upright, roundish, whitish, and spreading out at bottom: the scape short, with a subulate, reflex, flat spathe: the spadix subulate, shorter than the spathe. It is a native of the Levant, &c.

In the sixth species the root is roundish, compressed, smooth, half an inch in diameter: the plant a foot high, and upright: the leaves cordate at the base, three-lobed, large, few: the lobes ovate and sharpish: the petioles are long, angular, striated, widening at the base, and concave: the scape shorter than the leaves: the spathe very wide, flat, acuminate and dusky red: the spadix subsessile, subulate, shorter than the spathe; with male flowers at the tip, female at the base, and very many long flexuose red hairs in the middle. It is a native of Ceylon, and flowers in May and June.

The seventh is without stem: the leaves are halbert-shaped, and entire from the root, with the disk coloured, the middle of the sheath narrowed, and the lamina erect, pointed, roundish, and almost convolute. It flowers in June and July.

The eighth species has an erect jointed stalk, six feet in height, with arrow-shaped leaves in clusters at top; the flowers coming out between the leaves in long green spathes, close to the stem.

The ninth has the leaves sometimes punched with holes: it rises to the height of six or seven feet with a green jointed stalk as large as a walking-cane: the leaves are placed irregularly at the top of the stalks, growing in a cluster; they are oblong, and of a light green colour: from between the leaves the flowers come out on the side of the stalk, having a long spathe of a pale green colour, marked with white spots, sitting close to the stem of the plant: at the first appearance it stands erect, soon after it becomes horizontal, and in a little time declines downward: the lower part is swelling so far as the flowers are ranged on the spadix, above which it is greatly contracted, and toward the top enlarges again, where it is a little open, so as to show the naked part of the spadix, but is twisted again at the top: all the lower part folds closely over the spadix, so that it is scarcely discernible, unless the spathe be opened; which can only be done on one side, the other adhering closely to the spadix, so far upward as the flowers extend the naked part of the spadix only being separated from the spathe; so that the female flowers and stamina are ranged only on one side of the spadix; in which it differs from the other species. It is a native of the warm parts of America.

Culture.—In this genus of plants the propagation is mostly effected by means of offsets, or parting the roots, which may be done either in

the autumn or spring months. With the hardy sorts, as the three first, the planting may be performed in the common borders; but in the tender kinds, as the fourth, fifth, sixth and seventh species, it should be in pots of light earth, in order to be promoted in their taking root by a gentle hot-bed. They are afterwards to be kept in the bark-stove. When kept in shelves in the dry stove they do not succeed so well. The sixth and seventh sorts require to be guarded from cold by being placed in the tan-bed of the stove.

The two last species may be propagated by cuttings of the stems three or four joints in length, which, after being sufficiently dried, so as to heal the cut parts, may be placed separately in small pots of light sandy mould, and plunged in a moderate tan hot-bed, no water being given till they are well rooted. They should be constantly retained in the stove.

Such of the hardy kinds as produce seeds, may also be raised by sowing them in pots in the autumn, which should be placed in a gentle hot-bed in the early spring months, to promote their germination and growth.

The three first are curious, and serve to afford diversity in the borders and clumps of pleasure-grounds; but the *Dracunculus*, though a singular plant, is disagreeable from its unpleasant smell. The others are kept in the stove for the purpose of variety.

ARUNDO, a genus comprising plants of the herbaceous, perennial, and reed kind, some of which are of rapid growth.

It belongs to the class and order *Triandria Digynia*, and ranks in the natural order of *Gramina*.

The characters of which are: that the calyx is a one- or many-flowered, two-valved, erect glume: the valves oblong, acuminate, awnless, one shorter than the other: the corolla is two-valved, the valves the length of the calyx, oblong and acuminate, a *lanugo* arising from their base, almost the length of the flower: the nectary two-leaved, and very small: the stamina consist of three capillary filaments: the antheræ forked at both ends: the pistillum is an oblong germ: the styles are two, capillary, reflex and villose: the stigmas simple; there is no pericarpium: the corolla adheres to the seed without gaping: the seed is single, oblong, acuminate at both ends, and furnished with a long down at the base.

The species mostly cultivated are: 1. *A. Donax*, Cultivated Evergreen or Portugal Reed; 2. *A. Bambos*, Bamboo-Cane, or Great Indian Reed; 3. *A. colorata*, Reed Canary-grass.

The first, in its natural situation, has the culm six feet high or more, (ten, fifteen, and according to some authors twenty or thirty feet) hard, almost

woody, with knots or joints and diaphragma. Above each joint is a leaf, embracing the culm with a yellow, hollow sheath, two feet long, and three inches broad. The top of the culm ends in a point, the leaves rolling up in form of a cone. The panicle is a foot and half long, erect, and many-flowered. There are two flowers, and sometimes three in one calyx, but two only ripen. The calyxes are in general considered as three-flowered; but in the late editions of the *Systema Vegetabilium*, Martyn observes, "that they are given as five-flowered, on the authority of Turra." It is a native of the south of Europe, &c. and flowers here in July and August.

There is a variety with variegated leaves called *Striped* or *Parti-coloured Reed*, but which never grows to a third part of the height of the other, and the leaves are narrower and much shorter.

The second species has a woody, hollow, round, straight culm, in its native situation, forty feet high and upwards, simple and shining: the internodes a foot in length and circumference: sheaths thick, hairy, rough, convolute, deciduous: branches alternate, slender, solid, spiny, reclining, springing out from the base to the very top; the lower ones being usually cut off: the leaves small, quite entire, lanceolate, roundish at the base, striated, rough, on alternate round petioles. The hollow internodes of the culm are frequently found filled with a limpid liquor, which in India beyond the Ganges is not condensed into the substance called *Tabaxir* or *Tabasheer*, as it is, though rarely, in Malabar. The panicle of flowers is diffused, in spikes; spikelets oblong, imbricate: the calyx is two-valved, one-flowered; the valves acute, and convolute: the corolla two-valved, membranaceous, very small, and surrounded with hairs: stamina six, filaments very short, antheræ oblong: stigmas three, subsessile, long and villose: seed one, oblong. It is a native of most of the tropical regions, and may be raised here in the stove.

The third has a perennial root, long, thick, jointed, creeping, covered with whitish or brownish scales: the culms from two or three to five or six feet in height, upright, strong, round, smooth, with six or seven purplish or brownish knots; at each of which is a leaf from a hand to a span, a foot in length, and from five to eight lines in breadth, smooth except towards the end and on the sides, where they are somewhat scabrous, bright green, white about the edge, and with a white nerve: the sheaths striated, smooth, ending in a whitish, cloven ligule: the panicle from six inches to a foot in length, much contracted at first so as to resemble a spike, but spreading out in flowering time, branched, the branches crowded, closely

imbricate, and unequal; it varies in colour, being commonly purplish, but sometimes whitish: the peduncles in pairs or three together, the lower ones connected at the base, having a sharp little scale for a bracte: the florets imbricate, pointing one way, when flowering diverging on very short pedicels. The valves of the calyx with two ribs on each side, not much longer than the corolla, the outer valve a little less than the other. The valves of the corolla hairy at the edges, and furnished with a small, slender, hairy appendage on each side, the outer valve not rolled in. The nectaries two, lanceolate-acuminate, with one tooth on the outer edge. The seed oval, flattened, brown, and shining.

There is a variety of this grass cultivated in gardens, which has beautiful striped leaves, generally green and white, but sometimes with a purplish cast. It is known by the names of *'ladies' lace*, *painted grass*, and *ribband grass*.

Culture. The first species, though a native of a warm climate, is sometimes capable of resisting the cold of our winters in warm situations, where the soil is not too retentive of moisture, especially if a little litter be applied over the roots, when they prove severe.

It is propagated by parting the roots in the latter end of February or beginning of March, previous to the shooting forth of the new stems. They mostly shoot the same season, but seldom in a vigorous manner until the second or third year, when several stems proceed from the same stool.

The chief culture which it requires is that of being well supplied with water in dry seasons, and having the stems cut down and cleared away annually in the autumn.

The variegated variety, as being more tender, should be protected from the frost during the winter season.

The second sort only admits of being raised in well-regulated stoves in this country, in which it is sometimes capable of attaining considerable growth. It is propagated by taking off slips from the roots in the very early spring months, and planting them in large pots or tubs filled with good earth, which should then be plunged in the bark-bed in the stove or hot-house, full supplies of water being carefully afforded. If the roots of the plants be permitted to extend themselves in the tan of the beds, as the tubs decay they will grow with greater vigour; but great care must be taken in these cases not to disturb their roots on the refreshing or renewal of the beds.

The variety of the third species usually employed may be easily multiplied by dividing the roots in the autumnal season, and planting them

out again in the clumps, borders, or other places where they are intended to grow. The plants require no further culture, except that of clearing away the stems in the autumn.

The first kind affords variety by the singularity of its growth among the larger plants in the borders and other parts of pleasure-grounds. The second is preserved in the stove for the sake of curiosity. And the last is chiefly valuable for the diversity which it creates among the smaller herbaceous plants in clumps and borders.

ASARUM, a genus containing plants of the low herbaceous perennial kind.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters of which are: that the calyx is a one-leaved bell-shaped, three- or four- cleft, coriaceous, coloured, permanent perianthium; the clefts are erect and bent in at the top; no corolla; the stamina consist of twelve subulate filaments, half the length of the calyx; the anthers oblong, and fastened to the middle partition of the filaments: the pistillum is an inferior or concealed germ within the substance of the calyx: the style is cylindric, the length of the stamina: the stigma is stellate, six-parted, the parts reflex: the pericarpium is a coriaceous capsule within the substance of the calyx, being mostly six-celled. There are several ovate seeds.

The species of most note in garden culture are: 1. *A. Canadense*, Canadian Asarabacca. 2. *A. Virginicum*, Virginian Sweet-scented Asarabacca.

In the first the roots are perennial, thick, and fleshy, sending out many fibres. The leaves rise from the root, are much larger than in those of common asarabacca, and stand on longer foot-stalks; they are pointed and hairy. The flowers are like those of the other sort, growing close to the root, but are more inclining to green on the outside. It is a native of Canada, and flowers from April to July.

In the second species the leaves are veined and spotted on their upper surface, like those of the autumnal Cyclamen. The flowers are shaped like the others, but stand on longer peduncles, and are of a darker purple colour. They come out in April and May, and their seeds ripen in July and August. It is a native of Virginia and Carolina.

Culture.—These are hardy plants, of easy culture. They succeed to most advantage in situations which are moist and shady. They are propagated by parting the roots in the autumnal months, which should be planted out in the fronts of clumps or borders where they are to remain. In the Canadian sort, when the soil is too reten-

tive of moisture, the roots are apt to rot in the winter season.

The second kind succeeds best when planted in such a situation as not to be too much exposed to the sun during the day.

From their low growth they are less ornamental than many others, especially the first sort, but afford much singularity in their mode of flowering as well as their flowers, on which account they should always occupy the front situations in the places where they are planted out.

ASCLEPIAS, a genus comprising various plants of the flowery, perennial, herbaceous, and shrubby exotic sorts; and of the Swallow-wort and Dog's-bane kinds.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Convolvaceae*.

The characters of which are: that the calyx is a five-cleft, sharp, very small, permanent perianthium. The corolla monopetalous, flat or reflex, five-parted: the divisions ovate-acuminate, slightly bending with the sun. The nectaries five, growing to the tube of the filaments below the anthers, fleshy, or cowed; protruding from the bottom a sharp horn, bending inwards. The stamina consist of five filaments collected into a tube, swelling at the base: the anthers oblong, upright, and two-celled, terminated by an inflex membrane lying on the stigma, having a reversed wing on each side, growing broader downwards with its edge contiguous to the next. The pollen is collected into ten corpuscles, inversely lanceolate, flat, hanging down into the cells of the anther by short threads, frequently flexuose; which are annexed by pairs to five cartilaginous, twin tubercles, each placed on the tip of the wings of the anthers, adhering to the angles of the stigma, between the anthers. The pistillum consists of two oblong acuminate germs; styles two, subulate: stigma common to both, large, thick, five-cornered, covered at top by the apex of the anthers, umbilicate in the middle. The pericarpium has two follicles, large, oblong, acuminate, swelling, one-celled, one-valved. The seeds numerous, imbricate, crowned with down: the receptacle is membranaceous and free.

The species are very numerous, but those most commonly in cultivation are; 1. *A. vinetoxicum*, Common Swallow-wort, or Tame-poison; 2. *A. nigra*, Black Swallow-wort; 3. *A. Syriaca*, Syrian Swallow-wort, or Dog's-bane; 4. *A. purpurascens*, Purple Virginian Swallow-wort, or Dog's-bane; 5. *A. verticillata*, Verticillate Swallow-wort; 6. *A. decumbens*, Decumbent Swallow-wort, or Dog's-bane; 7. *A. tuberosa*, Tuberous-rooted Swallow-wort, or Dog's-bane; 8. *A. variegata*, Variegated Swallow-

wort; 9. *A. arborescens*, Arborescent Swallow-wort; 10. *A. fruticosa*, Shrubby or Willow-leaved Swallow-wort; 11. *A. undulata*, Wave-leaved Swallow-wort; 12. *A. crispa*, Curled-leaved Swallow-wort; 13. *A. Curassavica*, Curassoa Swallow-wort, or Bastard Ipecacuanha; 14. *A. volubilis*, Twining Swallow-wort; 15. *A. gigantia*, Curled flowered Gigantic Swallow-wort.

The first species has the root very large and much branched: it is composed of many strong fibres, which are connected at the top, like those of Asparagus. From this arise many stems, in number proportioned to the size of the root, near two feet high, very slender at the top, woody, round, hairy, and not branched. The leaves are cordate-ovate, acuminate, smooth, hardish, quite entire, glaucous-green, the midrib and sometimes the edge of the leaves a little hairy: the petioles short. Peduncles axillary, many-flowered, resembling proliferous umbels. The calyx small, green, divided at the end into five bristles. The corolla is commonly white: the follicles ovate-acuminate: the seeds small, brown, and wrapped in white cotton. It flowers in June, sometimes in May, and continues flowering to August, and is a native of most parts of the continent of Europe.

It is said to vary, with yellow flowers; and there is a variety with broader leaves.

The second species agrees with the above in the shape of its roots, leaves, and flowers; but the stalks extend to a greater length, and toward their upper part twist round any sticks or other plants near them; and the flowers are black.

It is by no means so common as the foregoing, having been found only in the south of France, the mountains about Nice, and in Spain. It flowers at the same time with the other.

The third creeps greatly at the root, and sends up strong stems upwards of four feet high; towards the top of them the flowers come out on the side; these are of a worn-out purple colour, smelling sweet; and sometimes they are succeeded here by large oval pods. It flowers in July, and is a native of North America. The French in Canada eat the tender shoots in spring as Asparagus. The flowers are highly odoriferous.

The fourth species has many stems, as thick as the little finger, at bottom quadrangular with blunted angles, and of a brownish green colour; above round and green, a little hairy. The leaves are on short petioles, from four to six inches long, and two or three broad; the midrib purple. The flowers have the petals of a dusky herbaceous colour, the horns of the nectaries pale and gaping, not erect but horizontal. It is a native of North America, and flowers from July to September.

The fifth species rises with slender upright stalks, at the top of which grow umbels of small white flowers, appearing in July, but never succeeded by pods in this climate. The leaves are frequently four together. The peduncles forming an umbel are opposite to the leaves. It is a native of North America.

The sixth has declining stalks, which are hairy, and eighteen inches in length. The leaves are narrow. The umbels grow at the extremity of the branches, are compact, and the flowers of a bright orange colour. It is a native of North America.

In the seventh species the stems are a foot high, hairy, round, and dusky red. The leaves alternate, except on the upper part of the stem. Below where it branches are generally two leaves, and at the place of branching four: on the branches themselves the leaves are again alternate. The flowers are of a bright orange colour. The tuberous roots very large. It is a native of North America, and flowers from the end of July to September, sometimes ripening seed in this climate.

The eighth, according to Linnæus, is allied to the third; but Dillenius thinks that it approaches very near to the *Amœna*, but that the stems are shorter, and commonly variegated with dusky purple spots; the leaves broader and rounder, more excavated, less rigid, not shining or hoary underneath, with the oblique veins deeper, so as to be even grooved; the flowers larger, pale, dusky flesh-coloured, sweet-smelling, the horns of the nectaries standing out and gaping more.

According to Miller, it resembles the fourth sort, but the leaves are rough, and the umbels of flowers more compact; they come out on the side of the stalk, are of an herbaceous colour, and are not succeeded by pods in this climate. It is a native of North America.

In the ninth species the stem is shrubby, rough with hairs, upright, as thick as the finger. The leaves opposite, on very short petioles, ending rather obtusely, but with a minute point, and smooth. The peduncles from the summit of the stem, umbelled, villose. The corollas are white. It is a native of the Cape of Good Hope, and flowers in December.

In the tenth the nectaries are compressed without a claw, instead of which are two long reflex ears. The follicles are inflated, and set with soft prickles. It is also a native of the Cape, and flowers from June to September.

The eleventh is a native of the Cape of Good Hope, and flowers here in July.

The twelfth has the stem pubescent, branching at bottom. The leaves sessile, repand.

One umbel of yellow flowers terminates the stem. Found at the Cape of Good Hope.

The thirteenth species has the stem from a foot to two or three feet in height, upright, simple, or generally so, round, pubescent, and milky. The leaves opposite and decussated, petioled, acute, entire, and smooth on both sides. The flowers in umbels: umbellules terminating, or opposite to the terminating leaflet in pairs, peduncled. Involucre none, but only a few subulate leaflets. The peduncle the length of the leaves: pedicels shorter, one-flowered. Calyx of five, lanceolate, reflex leaflets; corolla reflex. Nectaries five, round the middle corpuscle, ovate, ear-cowled obliquely inwards, with a little horn from the nectareous base sabre-shaped bent inwards. In the middle is a truncate corpuscle, hollowed at the tip, bluntly five-cornered, covered with five scales at the sides, and gaping with as many chinks. Scales hollowed within. Glands five, roundish, black, to which are fixed above, within the scales, pairs of glanduliferous pedicels, in place of anthers; these glands are oblong, pellucid, panduriform, and filled with prolific moisture. Germs two, ovate, acuminate; styles two, subulate, hid within the column; stigmas simple, and obtuse. Follicles oblong, acuminate, toothless, ventricose, and smooth. It is a native of South America, the West-Indian Islands, and China near Canton, and flowers from June to September.

The fourteenth species is quite smooth, with shining branches. The leaves petioled, ovate-subcordate, and veined. The umbels quite simple, on peduncles the length of the petiole. The flowers greenish. It is a native of Malabar, Ceylon, &c.

The fifteenth rises to six or seven feet in height. The leaves are thick; the flowers white; the pods very large; the base of the petiole bearded above. The nectaries do not put forth awl-shaped horns, but solid converging plates. It flowers from July to September.

Culture.—The method of propagating the different hardy kinds, as the first eight species, is by parting the roots and planting them out, either in the autumn as soon as the stems decay, or in the early spring months before the new shoots are protruded. They require a rather dry soil, as when there is too much moisture they are apt to have their roots destroyed by it in the winter season. They are likewise capable of being raised from seed, when it can be procured, by sowing it in beds or pots of light fresh earth in the spring months. With the seventh and eighth species, the pots should be plunged in a hot-bed,

and as soon as the plants present themselves they should be exposed gradually to the influence of the open air to strengthen their growth, and when sufficiently vigorous, be either pricked out on warm borders, or in the situations where they are to remain. In the former method they must be transplanted the March following into the places where they are to grow. In either mode occasional shade and water must be provided, and in the winter the roots be protected from the action of the frost by being covered with old tan, litter, or mats. These two sorts may also be occasionally increased by planting the offsets in the early spring.

They last many years when proper care is taken of them in the winter; but do not bear frequent removing well, or flower so strongly under such circumstances.

In the culture of the ninth and three following sorts the protection of a green-house is essentially necessary in the winter season.

The ninth and tenth kinds may be increased either by seeds or cuttings. In the first manner the seed should be sown in small pots filled with a light earthy compost, placing them in a hot-bed; and when the plants have attained a proper degree of size and strength they must be pricked out into separate pots, a due degree of shade and water being given till they have stricken fresh root, and afterwards as occasion may require.

The eleventh, twelfth, and other Cape sorts, may be propagated by sowing the seeds in the latter end of March or beginning of April on a moderate hot-bed, covered with light mould, under glasses, or even sometimes in the open air; and when the plants are become sufficiently strong and a few inches in height, they may be placed out into separate small pots filled with light fresh earth, being at first properly shaded and supplied with moisture: after being fully rooted they may be exposed in warm situations in assemblage with other exotic plants till the beginning of the autumn, when they must receive the shelter of the green-house.

The principal attention which is afterwards necessary with plants of this description is, that of properly potting them as they increase in size, and carefully exposing them in the open air during the summer months.

These sorts are likewise capable of being raised by setting the cuttings of the shoots in the latter end of the summer in shady situations, and after they have stricken good roots carefully removing them into pots, to be managed as the seedling plants.

The thirteenth and following kinds require to be kept constantly in the stove of the hot-house.

They may be increased by sowing the seeds in the spring either on a hot-bed, or in pots, and plunging them into the hot-bed; the plants, when sufficiently grown, being in the first mode transplanted into separate pots of good earth, to be, as in the latter method, plunged into the tan-bed in the stove of the hot-house. Plants of the thirteenth species should be annually raised, as they decline in the production of flowers after the first year.

The first kinds may be employed in the fronts of the clumps and borders of pleasure- or other grounds, where they have a good effect in mixture with other plants of similar growth.

The second sorts afford an agreeable diversity in the green-house during the winter, and in the compartments about the house in the summer season.

Those of the last description present a pleasing variety among other stove plants.

ASCYRUM, a genus furnishing plants of the perennial shrubby kind. The St. Peter-wort.

It belongs to the class and order *Polyadelphia Polyandria*, and ranks in the natural order of *Rotaceæ*.

The characters of which are: that the calyx is a four-leaved perianthium: the outer leaflets opposite, very minute, linear: the inner heart-shaped, large, flat, erect: all permanent. The corolla has four ovate petals; the outer opposite, very large, the inner less. The stamens consist of numerous filaments, bristle-shaped, slightly united at the base in four parts. The anthers are roundish. The germ oblong. Style scarcely any. Stigma simple. The pericarpium is an oblong capsule, acuminate, one-celled, two-valved, inclosed by the larger leaves of the calyx. The seeds numerous, small, roundish, and fixed to the edge of the valves.

The species cultivated for ornament are, 1. *A. hypericoides*, Shrubby St. John's-wort, like *Ascyrum*. 2. *A. villosum*, Hairy St. Peter's-wort.

The first is an elegant little shrub, seldom rising above three feet in height. It is very full of leaves and branches. The branches are dichotomous; the twigs compressed and ancipital. The leaves opposite, subsessile, lanceolate, obtuse, entire, very finely perforated, and smooth; and at their base are very small glands. The flowers terminating, peduncled, solitary, and yellow. Two leaflets of the calyx are four times as big as the two others, and inclose them; they are heart-shaped, blunt, and smooth. Corolla cruciform; petals the size of the larger leaves of the calyx, and spreading. The filaments are distinct, upright, surrounding the

germ the length of the petals. The germ oblong, sharp, and compressed: the style two, very short: stigmas blunt: the capsule is compressed, being covered with the shrivelled calyx. It is a native of South Carolina.

The second species grows about three feet high. The flowers are produced at the ends of the stalks, and are of the same shape and colour with common St. John's-wort. It grows naturally in Virginia.

Culture.—The best method with the first sort is to propagate it by cuttings made from the young shoots in May, as it rarely produces seeds in this climate. These should be planted in pots of good earth, and plunged into a moderate hot-bed, till they have stricken root, and the plants are become strong, when they may be transplanted into the situations where they are to remain, in the borders or other parts. A warm aspect should always be chosen for the purpose, and the roots must be protected, especially in severe winters, by being covered with tan, litter, or other similar substances. This sort may likewise be raised by layers put down in autumn.

The second kind may be increased by parting the roots in the autumn after the stems are decayed, planting them in situations where the soil is of a loamy quality. These after some time often produce seed. They should constantly be guarded from the action of frosts in the winter season.

These two species are useful in affording variety in extensive pleasure-grounds.

ASH *Common.* See FRAXINUS.

ASH *Flowering.* See FRAXINUS.

ASH *Manna.* See FRAXINUS.

ASH *Mountain.* See SORBUS.

ASH *Poison.* See RHUS.

ASHES, the particles of different ligneous and other substances which remain after the process of combustion. They are of different kinds; but those mostly employed in garden culture are *wood, turf, coal,* and *peat* ashes. Their effects on the soil vary in some measure according to the kinds. Such as contain saline matter in any proportion not only afford improvement on the stiffer and more tenacious sorts of ground, by rendering them more friable and mellow, but by their action upon them bringing them into a more fit condition for supplying the nourishment of plants. Mr. Nicol found where the ashes of green furze had been thickly spread on the surface, and afterwards dug into the earth, that when they had remained some time in that state of union, they produced the most beneficial effects in promoting the growth of different sorts of trees. In this view, therefore, the use of wood and turf ashes may

be of much advantage in bringing such new garden-grounds as are of a stiff adhesive quality into a condition proper for the growth of different kinds of vegetable crops. And where the grounds are too much inclined to moisture, they may be of great utility by the power which they possess of taking up the superabundant proportion of wetness. And it is not improbable but they may likewise contribute in the way of affording the food of plants.

Coal-ashes, probably from their containing a portion of calcareous matter, are also found to be highly beneficial on stiff and retentive garden-grounds, in rendering them more open and porous. In this view they are successfully used in the neighbourhood of many great cities where coal is much burnt for fuel. They also open the texture of clayey grounds, and correct their tenacity and other bad qualities. The gardeners about London know their value, and make a very profitable use of them, particularly in bringing into order those grounds which have been dug up for brick earth. And it is probable that peat-ashes may be made use of in the same intention with great benefit, as they have the property of lessening the adhesion of such soils.

The proportions in which manures of these kinds may be employed must depend in a great degree on the state of the grounds; but too sparing quantities can seldom be advantageous, where the principal object is that of rendering them more light and open. In the application of the two first sorts, care should be taken to preserve them for the purpose in covered sheds, and to have them laid on when the weather is inclined to be moist without being too wet.

ASP or ASPEN-TREE. See POPULUS.

ASPALATHUS, a genus containing plants of the ornamental shrubby exotic kind. The African Broom.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters of which are: that the calyx is a one-leafed, five-cleft perianthium: the divisions acuminate, equal, except that the upper part is larger. The corolla is papilionaceous: the banner compressed, ascending, obovate, generally hirsute on the outside, obtuse with a point: wings lunulate, obtuse, spreading, shorter than the banner: keel bifid, conformable with the wings. The stamina consist of ten filaments, united into a sheath gaping longitudinally at top, and ascending. The anthers are oblong. The pistillum is an ovate germ. The style simple and ascending. The stigma sharp. The pericarpium is an ovate awnless legume. The seeds are generally two, and kidney-shaped.

The species are numerous, but few have yet been introduced into cultivation. Those which have are, 1. *A. albens*, White Aspalathus; 2. *A. Indica*, Indian Aspalathus; 3. *A. argentea*, Silvery Aspalanthus.

The first has the stem shrubby, upright, with a brown bark full of chinks; the extreme twigs somewhat tomentose. The leaves five together, sharp and spreading a little at the tip, of a silky whiteness. The bunches of flowers terminating, silky-white, small, several, glomerate, and peduncled. The calyx is pubescent. No bracte under the calyx, but one under the pedicel. The corolla tomentose and white. It flowers here in July.

The second species is a shrub, with slender hard round twigs; branches alternate, short. The leaves are alternate, leaflets oblong, obtuse, sessile, broader towards the end, bluntish, smooth, the side-ones a little shorter. The peduncles from each of the axils longer than the leaf. The legumes half as long again as the peduncles. It grows about five feet high. The flowers are of a pale red colour; they appear in August, but are seldom succeeded by pods here. It is a native of the East-Indies.

The third rises about four feet high, with a shrubby stalk dividing into slender branches. The flowers are purple, downy, and grow thinly on the branches; they come out late in the summer. The leaves are in threes or in bunches, lanceolate, silky, as is the whole plant. Flowers in spikes, or else scattered, lateral, villose. It flowers in July and August.

Culture.—The propagation in these as well as the other species of this genus may be effected by sowing the seeds, when they can be procured, in the autumnal season, in pots of light earth, and immediately plunged in a very gentle tan hot-bed, being removed into another moderate hot-bed in the spring, for the purpose of bringing the plants forward. They may also be sown in the spring; but in this case they will mostly require to be placed in an old tan-bed in autumn, and to have a fresh hot-bed in the spring, as when sown at the above period they rarely rise the same year. After the plants are become sufficiently strong they should be planted out into small pots, separately filled as above, and plunged into a gentle hot-bed, and when well rooted be gradually accustomed to the influence of the open air, being placed in warm sheltered situations till the period of taking them into the green-house. They should have but very sparing supplies of water during the winter season, as they are apt to be destroyed by it.

ASPARAGUS, a genus containing a valuable plant of the esculent kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that it has no calyx: the corolla consists of six petals, cohering by the claws, oblong, erected into a tube; three alternately interior, reflex at the end, and permanent; the stamina have six filiform filaments inserted into the petals, erect, shorter than the corolla; the anthers are roundish; the pistillum is a turbinate germ, three-cornered; the style very short; the stigma a prominent point; the pericarpium is a globular berry, umbilicated with a point, three-celled; the seeds are two, round, angular on the inside, and smooth.

The species cultivated is *A. officinalis*, Common Asparagus.

It has a large perennial root, composed of many succulent round-bulbs forming a kind of transverse tuber, whence spring numerous stems, which are round, smooth, green, stiff, and branched, in the wild plant a foot and a half high or more, but in the garden plant much higher; branches alternate, thinly subdivided into alternate twigs with a few leaves between them: at their base is a single stipule, which is membranaceous, brownish, triangular-ovate, tapering to a point, the base also running down into a pointed prominence: there is also a stipule at the base of each bundle of leaves, which is cordate-ovate, pointed, ragged at the edge, and often cracking at the sides, its base inclosing the whole bundle. Linnæus mentions two smaller stipules with this. The leaves are three, four, or five in a bundle, of different sizes, linear or bristle-shaped, green with a white point, smooth, four or five lines in length. The peduncles are axillary, pendulous, solitary or two together, one-flowered, sometimes two-flowered; they have a tubercle or joint above the middle, and are protected at the base by the stipule of the twigs. The corolla is yellowish green; the berries red, with the remains of the corolla at the base.

Culture.—In the cultivation of this useful vegetable the plants are invariably raised from seed, which, after three or four years' growth, become in a proper condition for producing full-sized heads of Asparagus; the same roots continuing to afford supplies annually during several weeks in the summer season, as well as during the winter and early spring months, by being forced in pits or frames constructed for the purpose; the shoots remaining after the summer cuttings run up to stems, flower, and produce perfect seed in the autumn.

The soils on which Asparagus may be cultivated to the greatest advantage are those of the

more deep, light, loamy, or alluvial kinds. The very strong loams do not answer so perfectly for the culture of this plant as those of the less heavy sorts.

It is necessary to be particular in the preparation of the ground for the reception of the plants, both on account of the great length of time which is required before they attain perfection, and from little being capable of being done after they have been put in without injuring their roots. It should constantly be well trenched to the depth of two feet or more, and a proper quantity of manure well incorporated with it at the same time. The best manures are probably composts of good horse- or cow-dung with vegetable mould; but some employ sea-weed, marle, and other substances in the same way, especially where the soil is inclined to be stiff.

The most proper situations for this sort of culture are those which are open and well exposed to the free action of the air and sun, as in these cases the *Asparagus* is not only more early but better flavoured.

Raising the Plants, and Methods of Planting.—The usual mode of providing the plants is by raising them from seed, which should be carefully selected from the best plants, and sown on a bed of good light earth about four feet in width in the latter end of February or beginning of the following month, either in broad-cast over the surface, or in drills at the distance of six inches lengthways, the ground being then raked even. When the plants appear they should be kept perfectly clean from weeds during the summer, and the crowns of the roots protected in the winter by spreading a little short stable litter over them. They are sometimes transplanted so as to form the beds in the spring following; but it is a better practice to let them remain till they are two years old, as the plants are less liable to be destroyed.

Some, however, think it the best method to let the seed be sown at once where the plants are to remain, as by that means they become much stronger at the time of cutting than when they have been transplanted.

In planting, different methods are pursued, as in beds of four feet in width, with alleys of two feet between them; in beds of two feet, with alleys of the same width; and in single rows at three feet or more apart. But though the first is the most common mode, the latter are preferable in many cases.

In the two first methods the roots of the plants should be carefully taken up from the seed-bed, and be made use of without undergoing any trimming. With the four-feet and two-feet beds the plants are usually put in rows at the distance of a

foot from each other, the first having four rows, and the latter two rows lengthways of the beds. They are commonly set in small drills or narrow trenches, but some use a small dibble for the purpose.

In the single-row method it is probably the best practice to drill in the seeds, though the roots may be employed where they are thought preferable.

The beds should be formed of proper dimensions in a neat regular manner by means of a line, and then spaces according to their breadths marked out for the rows, beginning nine inches from the edges. Then stretch a line tight along the length of the bed in the first, outside row, and with the spade held in an erect position, the back being placed towards the line, cut out a small trench along close to the line about six inches deep, forming the side next the line upright, turning out the earth evenly to lie close along the edge of the trench, ready to earth in the roots as planted. This being done, proceed to planting the row, placing the plants in the trench close against the upright side about eight or ten inches asunder, with the crowns upright about two inches below the surface, spreading the roots both ways, and drawing a little earth up to those of each plant as they are put in, just so as to fix them in their places till the whole of the row is planted; then directly rake the excavated earth into the trench evenly over the roots and crowns of the plants; which done, move the line a foot further for the next row, and cut out another trench as before, and plant it in the same manner, directly earthing over the plants as in the first row, and so with the rest till the whole is completed. Having finished the planting the beds, the alleys may either be lined out now regularly, or deferred till the winter or spring dressing; though where the beds and alleys are formed previous to the planting, it may be eligible to line them neatly in their proper dimensions as soon as planted, making the edges of the beds full and straight, and the alleys level and even. Some sow the beds with onions, lettuce, or other similar crops; but this should always, if possible, be avoided.

Beds thus planted will continue ten or twelve years or longer.

Asparagus, after being thus planted out, requires the following cultivation: the shoots, as soon as they present themselves above ground in the beginning of May, which are often not much bigger than straws, must be permitted to run wholly to stem, and during summer be kept clean from weeds by small hoeing or hand-weeding three or four times; and where other crops are cultivated with them, thin them in the usual

way, cutting out all such as grow immediately about the Asparagus plants.

In October, when the Asparagus' stalks begin to decay, cut them down and clear off all weeds into the alleys, digging them two feet wide, burying the weeds therein, and spreading some of the earth over the beds, as directed below. This is all that is necessary until March, at which time the beds should be deeply hoed and raked smooth, permitting all the shoots to run up as in the first summer; and in the following October cut down the decayed haulm as before, and land up the beds: in the spring following, which is the second after planting, slightly fork-dig the beds and rake them level.

In this spring, as the shoots sometimes rise of tolerable substance, it is occasionally the practice to gather a few of the largest which first appear; but it is much better to defer this till the third or fourth year.

Landing up and manuring the Beds.—The time to give the Asparagus-beds their winter dressing is from the beginning of October to the latter end of November. This, as mentioned above, consists in cutting down the decayed stalks of the plants and clearing them from weeds, digging the alleys, and spreading some of the earth over the surface of the beds, which is termed landing up the beds. It is performed in the following manner: the stems are cut down close, or within an inch or two of the ground, with a knife; then all the weeds removed with a sharp hoe, drawing them off at the same time to be buried in the alleys; after this proceed to line out the alleys, stretching it along the edges of the beds about nine inches from each outward row of plants, the stakes usually placed at the corners of the beds, or the stumps of the stalks, serving as guides. When this has been done, chop with a spade the ground along by the direction of the line, forming each bed four feet wide, and the alleys two feet. The alleys are then to be dug one spade or more deep, and a good portion of the earth spread over each bed two or three inches thick. As you proceed in digging let the weeds drawn off the beds be trimmed into the bottom of the alleys, and buried a due depth, observing to land the beds all over of a regular thickness, so as to make them about six or eight inches higher than the level of the alleys, forming the edges of each bed full and straight. This work must be repeated every autumn; and before the earth is laid on, it is a good practice to apply a covering of well-rotted stable-dung in an even manner over the whole surface. The drainings of stables and dunghills may likewise be applied with much benefit in the autumnal season: but some only make use of manure once in two or three years

to their Asparagus-beds. But as the plants are of strong growth, the more frequently this is done the better. Instead of landing up the beds in the autumn, it is the practice of the "Scotch Forcing Gardener" to merely free the surfaces of the beds from all sorts of weeds, and stir the mould up to the depth of about three inches with a fork, in order that they may not only derive the fullest advantage from such manures as may be applied, but be more completely acted upon by the atmosphere, as little danger is supposed to be apprehended from the effects of frost on the plants.

Spring-Dressing the Beds.—This operation consists in fork-digging the beds to a moderate depth to loosen the soil, that the buds may freely advance and swell to their full size. The season for performing the work is in March, but not later than the first or second week in April, as many of the buds will then be formed, and in forward seasons begin to advance. The business is mostly performed with a short, flat, three-pronged fork. In the first spring-dressing after planting it is proper only to loosen the surface mould with a hoe two or three inches deep, and rake the beds smooth. But the general spring-dressings should be performed by fork-digging all such beds as have been planted more than one year, three or four inches deep, with the Asparagus-fork, being careful to loosen all the earth as deep as the surface of the roots, having regard, however, not to wound or disturb the crowns of them. After this has been done, the beds should be neatly raked to break the clods, clear off stones, and form a level smooth surface, drawing off all rough earthy or other matters into the alleys, which should afterwards be raked up in a neat order.

It is the custom of the author of the "Scotch Forcing Gardener," when the beds have been covered with manure in a littery state in the autumn, to remove the coarser parts of it in the spring, pointing in the more reduced parts, and at the same time applying a little fine mould over the rows, being careful not to injure the plants in the operation.

Gathering the Produce.—After the Asparagus plants have attained their perfect growth, the buds from all the plants may be cut over regularly during the season. The proper size of them for use is when they are two or three inches above the surface of the earth, while the heads remain compact and plump. The principal season for cutting is from the latter end of April or beginning of May, according to the earliness of the season, until the middle or latter part of June.

Raising Asparagus by Forcing.—Besides the

method of cultivating *Asparagus* in the natural ground during the spring and summer seasons, it may be raised in winter or the very early spring months by being planted in frames or pits, and forced by means of a hot-bed heat. In order to have constant successions in this way at these periods, fresh beds should be made and planted every month or six weeks, according to the demand.

Raising the Plants.—For this purpose, as in the former, the plants are to be propagated in the open ground, from seed, in the manner already directed, being kept perfectly clean, and suffered to remain without being cut over, till they have attained a sufficiently vigorous growth. In this intention different pieces of ground should be annually sown in the spring, so as to be constantly coming forwards in regular succession for being planted on the hot-beds. But when this cannot be done, the plants may be purchased from the kitchen-gardeners in the vicinity of most large towns.

For this use some employ plants of three or four years growth; but Mr. Nicol thinks that they should not be of less than four years, or of more than seven or eight years growth. And it is advised that they should be kept covered with straw or litter during the winter, in order that they may be readily procured in the time of frost.

The quantity of plants necessary for this purpose is considerable, the space of three rods of ground only furnishing a sufficient proportion of plants for a three-light frame, as they should be planted in a close manner; a bed of this extent not affording more than about three or four hundred large buds weekly, besides *Sprew*, for the period of three weeks or a month at most.

The season for beginning this work should be regulated by the time when the vegetable is wanted for the table. It is frequently begun as early as the latter end of September, but the most usual time is the middle of November; and it may be continued nearly until the period at which the natural *Asparagus* comes in.

Making the Beds.—In the common method of forcing this vegetable the hot-beds are prepared in the usual manner, by throwing together a suitable quantity of fresh horse stable-dung, so as to form beds of about two feet and a half or three feet in height in an upright manner, fine mould or earth being then applied over the surfaces to the thickness of six or eight inches; the outsides of the frames being well lined and benked up with the same materials after the plants are put in, that the heat may be sufficiently preserved, and the plants nearest the sides be preserved from the effects of frost. The beds are sometimes made on the level surface,

or by being slightly raised above it; but where the soil is dry, a trench or excavation six or eight inches in depth may be made for them.

The author of the "*Scotch Forcing Gardener*" recommends that the stable-dung for the beds should be twice shaken over, remaining each time four or five days to sweeten, or let off the rank steam, before the beds are made up. They should then be formed to the height of three feet in front and four in the back, extending a foot further than the frames all round. And after the whole surfaces have been made even they should be covered with turfs, cut so as to form again in an exact manner, being laid the green sides downwards, and smoothed well with the back side of the spade; the frames are then to be placed over, which should have the depth of thirty inches in the backs and twenty in the fronts. In these, good, dry, old tan, that has been well reduced, should be laid in an even manner to the thickness of eight inches or more; or where this cannot be procured, light sandy earth, with a fourth part of good vegetable mould, may be employed. Beds prepared in this way, when they begin to heat, produce less steam than in the ordinary manner; which is the reason of their being turfed. But if any steam arise the frames should be opened to let it off, though it is not of any material disadvantage till the plants appear.

The most suitable situations for forming beds of this sort in, are those which are the least exposed to the west or north winds, and the most open to the influence of the sun. The melon or cucumber grounds answer perfectly well when sufficiently spacious; and it is an advantage if plenty of good mould and earth be at hand for preparing the beds with.

It is, however, suggested by Mr. Nicol, that forcing in flued pits constructed for the purpose is a much preferable and more convenient method; and that the *Asparagus* is of a much better colour and finer flavour than when cultivated on dung hot-beds. And besides, the pits answer various other purposes. The growth of the plants can also be regulated with much greater convenience and exactness, so as to suit the times of their being wanted. It is observed, that a pit twenty-five or thirty feet in length, six in width, and which one fire can command, is sufficient for forcing *Asparagus* so as to supply a large family from November to May in a regular manner, and be afterwards employed in raising various other sorts of crops. The consumption of fuel in these cases is considered as very trifling when the advantage of such contrivances is attended to. Flued pits for this use may be seen in the plate on *beds and pits*.

Stable-dung as well as tan may be made use of in these pits. In practice, three-fourths of the former in the same state of preparation as for ordinary hot-beds has been made use of with success; but it is not so easily managed as the latter, from its heating more violently, and the steam not being so easily let off. Dung ought, therefore, when employed in this way, to be more carefully prepared. A very small degree of bottom heat is required in this culture; of course when such pits have been used in raising pines, the beds will require no additional preparation for Asparagus, except that of making them even, and refreshing them with a little old tan on the surfaces. But if melons were the preceding crop, the beds should be stirred up to the depth of two feet, adding some new tan or dung, and then levelling the surface with old rotten tan, as in the former case. In either instance the surfaces of the beds should be made so as to slope towards the sun, and about six inches above the bottoms of the flues, allowing so much for settling. The plants are put in as in other cases. When the flues are of the length mentioned above, one half may be sufficient at a time, the other being prepared in fifteen or twenty days afterwards, in order to keep up a succession. After this, once a month may answer the purpose.

In this mode of culture it is observed, that no fires are necessary when the thermometer stands so high as forty-eight or fifty degrees; but should when necessary be covered with mats in the night, and have air freely admitted in the day when the weather is fine. When fires are requisite they should be employed in a cautious manner; a small one made in the evening may serve for the whole night, and none need be made in the morning, except when the weather is severe: it may, however, be sometimes useful to have one in the morning, in order that air may be admitted freely, and at the same time a due degree of heat be kept up. A higher degree of warmth is, however, to be preserved in this way than in the hot-bed method, which should be regulated by the state of the tan and the healthy aspect of the buds. In beginning with the first end of the pit a second time with roots it is not necessary to stir up the tan, nor perhaps at the third filling; but this should be regulated by watch-sticks thrust into the tan-beds, or the thermometer plunged in them. Fresh materials will not, however, be necessary, as by stirring up the beds to the depth of two feet the purpose will be fully answered for the season. When dung or oak-leaves are made use of the beds should be turfed over, and a foot in thickness of rotten tan or light mould laid over

before the plants are put in; but this is unnecessary where tan alone is employed; but not more than an eighth part of new tan should be mixed in.

Planting the Roots.—The beds being prepared in the methods directed above, the roots should be immediately placed in them without waiting for the heat being in a proper state.

In order to this, in the first method, mark out the extent of the frames, and then within that, crossways, raise a small ridge of the surface earth five or six inches in height, against which place a row of roots, which should not be trimmed, pretty close to each other, the crowns upwards, and the roots a little inserted into the mould. A second row is then to be placed in the same way sufficiently near this; and proceed in the same manner till the whole frame is filled. They should then be covered over in an equal manner with fine mould to the depth of an inch or rather more, and when the beds are not formed larger than the frames, earth should be laid up on the outsides against them in the manner already directed.

The beds should remain in this state till the rank heat be gone off, which may be known by trying-sticks thrust in occasionally, being covered at top in severe seasons as occasion may require. It is of much consequence to guard against too much or too little heat at this time. The frames and glasses may then be placed over the beds; and when the buds begin to show themselves they should have an additional covering of fine mould to the thickness of four or five inches, the frames and glasses being replaced over them, the latter being removed either wholly or in a partial manner when the weather is mild, but in the nights they should be covered with mats or dry litter as there may be occasion. The planting in pits is performed in the same manner as in ordinary hot-beds.

General Culture.—In the management of this vegetable in the forcing method, whether in frames or pits, attention is necessary to see that the colour and flavour of the buds be not injured by the rank steam on their first coming through the mould, and that their growth be fully promoted by the due regulation of the heat of the beds, and by a suitable admission of air in mild weather, as well as light and sun. Mr. Nicol remarks, that while the beds have rank heat in them Fahrenheit's thermometer should not stand higher than 50° at any time unless in sunshine, and even then not to exceed 60°.

When the heat of the beds begins to decline, it may sometimes be necessary to have recourse to linings of the same materials as the beds were formed of, in order to raise it. These should be

applied on the sides of the beds in a slanting manner, and be made use of in a partial and cautious manner, frequent recourse being had to the trying-sticks, in order that the heat may not be too great.

During the growth of this vegetable a little water may be sparingly applied, but care should be taken not to have too much.

The buds are in general in a proper state to be cut over in about six weeks from the time of planting, or when they are risen five or six inches in height. The best mode of gathering them is by breaking them off close to the crowns by pushing the finger and thumb down into the earth.

ASPEN-TREE. See *POPULUS*.

ASPHODELUS, a genus containing plants of the herbaceous perennial and annual flowery kinds, having fleshy fibrous roots. The King's Spear.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronariae*.

The characters of which are: that it has no calyx: the corolla is one-petalled, six-parted; the divisions lanceolate, flat, and spreading: the nectary consists of six very small valves, converging into a globe, inserted into the base of the corolla: the stamina have six filaments, subulate, inserted into the valves of the nectary, bowed; alternately shorter: the anthers are oblong, incumbent, and rising: the pistillum is a roundish germ, within the nectary: the style subulate, in the same situation with the stamens: stigma truncate: the pericarpium is a globular capsule, fleshy, three-lobed, and three-celled: the seeds several, triangular, and gibbous on one side.

The species are, 1. *A. luteus*, Yellow Asphodel, or King's Spear; 2. *A. ramosus*, Branched Greater White Asphodel, or King's Spear; 3. *A. fistulosus*, Hollow or Onion-leaved Minor Asphodel, or King's Spear.

The roots of the first are composed of many thick, fleshy, yellow tubers, joined into a head at the top; whence arise strong, round, single stalks, near three feet high, covered their whole length with long three-cornered, boat-shaped leaves, of a sea-green colour: the upper part of the stalk is adorned half way with yellow star-shaped flowers, which begin to open at bottom, so that on the same spike there is often a succession of flowers during a full month from the time of its beginning to flower, which is in June, or towards the end of May. It is a native of Sicily.

The second species has likewise roots composed of many thick fleshy fibres, to each of which is fastened an oblong tuber, as large as a

small potatoe; the leaves are long and flexible, having acute edges; they grow in irregular clusters from the crown of the root; among these come out the stalks, which rise more than three feet high, sending out several side branches, which are naked; the upper parts of these are adorned with many star-shaped flowers, which are white with a purple line running longitudinally along the outside of each segment. They grow in long spikes, flowering successively from the bottom upwards. They appear the beginning of June, and the seeds ripen in autumn. It is a native of the south of Europe.

There is a variety, according to Miller, which is unbranched, with white flowers.

The third species is an annual plant. The roots are composed of many fleshy yellow fibres. The leaves are spread out from the crown of the root, close to the ground, in a large cluster; they are convex on their under side, but flat above, and hollow. The flower-stalks rise immediately from the root, and grow about two feet high, dividing upwards into three or four branches, which are adorned with white starry flowers, having purple lines on the outside: these come out in July and August, and their seeds ripen in October, soon after which the plants decay. It is native of the south of France.

Culture.—These are plants that require little trouble in their cultivation, and which succeed in almost any soil or situation. They are capable of being propagated by seeds and by parting the roots.

In the first method the seeds should be sown as soon as they are perfectly ripened in the autumn, upon a bed of light fresh earth in a warm aspect. The plants will rise in the early spring months, and after being kept clean during the summer, may be transplanted into fresh beds in the succeeding autumn or spring, at the distance of six inches from each other, and in the following autumn be planted out in the situations where they are to remain. But it is probably a better practice to remove the plants from the seed-bed into the places where they are to continue, as in this way they grow with more vigour. The third sort can only be raised from seeds, which should be sown in the autumn; and the plants, when they have put out three or four leaves, be removed into the places where they are to grow.

In the latter mode the slips or parted roots may be planted out, either on beds or in the places where they are to grow, in the autumn or early spring. In the former case the plants are usually allowed a summer's growth before they are removed. In either way the tops of the roots should be covered three or four inches

with mould. They usually flower in the following summer.

The first species multiplies rapidly by roots, but the second more sparingly, and does not bear transplanting so well, as it is rendered more weak in its flowering.

The variety with white flowers is less hardy than either of these species.

In severe winters it is useful to protect the roots by the application of tan or stable-dung; and the stems should be annually cleared away when they begin to decay in the autumn.

These plants afford considerable variety, when properly intermixed with others of the flowering hardy kinds in the borders and other parts of pleasure-grounds, producing a good effect from their continuing long in blow.

ASSA-FŒTIDA. See FERULA.

ASTER, a genus comprehending different fibrous-rooted flowery plants of the annual and perennial herbaceous and shrubby kinds. The Starworts.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositi Radiati*.

The characters are: that the calyx is common imbricate; the inner scales prominent a little at the end, the lower ones spreading: the corolla compound radiate: corollules hermaphrodite numerous in the disk: the females ligulate, and more than ten in the ray. Proper, of the hermaphrodite, funnel-shaped, with a five-cleft spreading border; of the female ligulate, lanceolate, three-toothed, at length rolling back: the stamina hermaphrodite, five filaments, capillary, and very short: the anther cylindric and tubulous: the pistillum is hermaphrodite: one oblong germ: the style filiform, the length of the stamens: stigma bifid, spreading: females, germ and style the same: stigmas two, oblong, and revolute: no pericarpium: the calyx scarcely changed: the seeds solitary, oblong, and ovate: down capillary: the receptacle is naked and flattish.

The species principally cultivated are, 1. *A. Chinensis*, China Aster, or Chinese Starwort; 2. *A. Tradescanti*, Tradescant's or Virginia Starwort; 3. *A. Amellus*, Amellus, or Italian Starwort; 4. *A. Alpinus*, Alpine or Great Mountain Starwort; 5. *A. Novæ-Angliæ*, New-England Starwort; 6. *A. grandiflorus*, Great Blue Pyramidal Aster, or Catesby's Starwort; 7. *A. puniceus*, Red-stalked American Starwort; 8. *A. undulatus*, Waved Starwort; 9. *A. linifolius*, Flax-leaved Starwort; 10. *A. tenuifolius*, Fine-leaved Starwort; 11. *A. Ericoides*, Heath-leaved Starwort; 12. *A. dumosus*, Bushy Starwort; 13. *A. concolor*, Single-stalked Starwort; 14. *A. di-*

varicatus, Divaricate Starwort; 15. *A. Novi-Belgii*, New-Holland Starwort; 16. *A. paniculatus*, Panicked Starwort; 17. *A. fruticosus*, Shrubby Starwort. In this numerous genus there are several other species equally deserving the attention of the cultivator.

The first is an elegant annual plant, rising in height from eighteen inches to two feet; the stem is erect, stiff, furrowed, and as thick as the little finger, putting out long bending branches from top to bottom. The leaves next the ground and at the origin of the branches are large, and resemble those of common *Chenopodium*: those on the branches are much smaller, and the upper ones narrow and very entire: the flowers are the largest and handsomest of any of the species in this genus: the disk yellow, at first flat, then convex; the floscules of the ray are broad and long, scarcely notched at the end.

There are varieties of this plant with single white flowers, single blue flowers, single purple flowers, single red flowers; with double white flowers, double blue flowers, double red flowers, and with variegated blue and white flowers.

The second species has radical leaves three or four inches long, like those of the willow, from green inclining to brown, with small scattered serratures. Among these come out round, smooth, woody, brownish stems, clothed with similar leaves, only shorter; they are elegantly divided into many slender, hard branches, two or three feet high, adorned with abundance of very small white flowers during the months of September and October. According to some, the disk is purple. The ray of the corolla is first white, and afterwards purplish. It is a native of Virginia.

The third sort has the stems growing in large clusters from the root, each of them branching at the top into eight or ten peduncles, each terminated by a single large flower, having blue rays, with a yellow disk. It flowers in August or September, and in mild seasons will often continue till the middle of November. It grows naturally in Italy.

There are varieties with white flowers and with wrinkled leaves.

The fourth species seldom rises more than nine, commonly from four to six inches high, in its native situation, and when transplanted into gardens, from nine to ten, but rarely above sixteen. At the top of each stalk is one large blue flower, somewhat like that of the Italian Starwort. It flowers in June, and is a native of the Alps, &c.

There are varieties with white rays and with blue rays.

The fifth species has many stems, five feet

high, brown, terminated by large purple violet flowers, growing in a loose panicle, and expanding in August. The peduncles are so short as scarcely to appear among the flowers. It is a native of New England.

The sixth has many stems, three and even four feet high, stiff, reddish, hairy, and branching pyramidically. The branches have small lanceolate leaves, growing alternate, hairy and rough to the touch, the size of those of common Hyssop, and each terminated by one large blue flower, coming out at the end of October. It is a native of Virginia.

The seventh sort has several strong stems, upwards of two feet high, of a purple colour; but the flowers are on single peduncles, forming a corymb at top, and of a pale blue colour: they appear about the end of September. It is a native of North America; varies in height from eight to three feet, having the stems either dark purple or reddish green.

There is a variety, in which the flowers are purple inclining to red, and surrounded by a few narrow leaves. This is from Philadelphia, and flowers in November.

The eighth species has the leaves broad and heart-shaped at bottom; the stems between two and three feet high, with small side branches, upon which the flowers come out in loose spikes; they are of a pale blue colour, inclining to white. It flowers in August. It is a native of North America.

The ninth has the leaves lanceolate, gradually narrowing to the end: peduncles with very small subulate scales: the stems strong, from two to three feet high, putting out many side branches near half their length, terminated by one blue flower, which appears in August and September.

In the tenth species the stems are five feet high, slender, angular, smooth, but not branching much; the leaves alternate, not very rough; the flowers terminal, solitary, small, and white; the peduncles have very small subulate leaflets scattered over them.

The eleventh has the stems slender, three feet high, with slender side branches most of their length, so as to form a thick bush; they are terminated by single flowers.

The twelfth species has the stems upright, two feet high, full of branches, which are filiform; the stem-leaves being narrow-lanceolate; on the branches linear: the peduncles filiform, striated, one-flowered, with very narrow leaflets on them; the flowers small, with an erect, imbricate, loose calyx; the ray copious, and white; the disk yellow, with fewer flowers.

The thirteenth species rises four feet high; the flowers are pale blue, appearing about Michaelmas. The whole plant is tomentose, especially the

leaves and calyxes. The raceme simple, with very short peduncles. It is a native of Virginia.

The fourteenth has the stems rough, about two feet high, dividing towards the top into many forked branches, diverging from each other. The flowers grow almost in an umbel, and appear the beginning of September. It is a native of Virginia.

The fifteenth species has the stem obscurely furrowed, of a pale red, not very erect, but irregularly flexuose, corymbosely branched, the branches divaricate and much divided; the leaves of the same form, sometimes having a single serrature, the edge scabrous, if the finger be drawn toward the base, the surface rough with invisible hairs; the flowers rather solitary, somewhat small, on long, scaly, yellow peduncles; scales of the calyx distant, in five rows; disk of the corolla yellow; ray pale blue, revolute; the height near four feet, having broad leaves at the bottom, which diminish gradually to the top. The flowers appear at the latter end of August. It is a native of Virginia.

The sixteenth rises to the height of four feet, the stems putting out side branches towards the top, which grow erect, forming a loose spike of large blue flowers, expanding about the end of October. It is a native of North-America.

The seventeenth species has the stems three feet high, with side woody branches having clusters of narrow leaves like those of the Larch-tree; the flowers are produced from the side of the branches, upon long slender peduncles singly; they are of a pale blue colour, and appear the beginning of March. It is a native of the Cape.

Culture.—The hardy kinds of these plants easily succeed in almost any soil or situation. The first sort, and varieties being annual plants, are propagated by sowing the seeds of the different kinds from the beginning of March to May, on a very moderate hot-bed, just to bring up the plants, the air being admitted as much as possible when the weather is suitable, in order to promote the vigorous growth of the plants; when they are sufficiently strong they should be planted out either into beds of good earth at six inches distance each way, or into the places where they are to remain, in the borders or other parts: the latter is probably the better practice, as they grow more strongly. In the bed method they are usually transplanted after a few weeks, with large balls of earth to their roots, into the situations where they are to flower, the mould being made fine about them. A few of the fine double varieties may also be

put in pots. Moist weather is the most suitable for this business, but in other circumstances a little water should be given immediately after the earth has been closed round their roots, as well as in future when it may be necessary.

But when the sowing is not made at an early period, the best practice is to let it be done in the situations where the plants are to grow, which should be rather warm and dry, the mould being made fine by a rake in the spots where they are to be put in, as in this way their growth is less checked than when transplanted.

In either method of sowing, care should be taken that the seed be only covered in a very light manner, and that the mould be made very fine.

The only further culture which they require, is that of keeping the plants perfectly free from weeds, and well supported in the time of flowering.

The whole of the hardy American sorts as well as the Italian species may be readily increased by parting the roots. In the former it is best performed in the autumn, the parted roots being immediately planted out in the places where they are designed to flower.

The latter or Italian sort should have the roots parted and replanted as soon as the flowers begin to decline, as, when the business is deferred till late in the autumn or the spring, the plants neither grow so strong nor flower so completely. The roots in this kind should not be taken up oftener than once in three or four years, where a full display of flowers is the principal object.

This sort has not been so much attended to since the introduction of the American species; but from the plants creeping less by the roots, and requiring less support in the stems, they are equally deserving of regard for the purpose of cultivation.

As this sort is not, however, capable of increasing fast by dividing the roots, it may be readily multiplied by planting cuttings from the young shoots in the later spring months, in situations where the mould is light and fine, being well shaded from the effects of the sun till they are perfectly established in the soil.

The last or shrubby sort must be propagated by setting the cuttings of the young shoots, in pots of light earth, in the spring or summer months, which should be plunged in a hot-bed to promote their striking root. They may then be placed out in the open air during the summer season, but in the autumn and winter they require the protection of a green-house.

The first sort, or *China Asters*, are elegant

plants for the purpose of variety, in the clumps and common borders of gardens, or pleasure grounds. In saving the seeds, they should be selected from the best coloured flowers of the most perfect plants, in October, when they are fully ripened, and be gathered when quite dry.

The perennial sorts have likewise a showy appearance, in large clumps and borders, when judiciously distributed among other hardy shrubs and herbaceous plants; some of the species continuing to flower to a late period in the autumnal season.

The shrubby kind affords variety among other green-house plants, both in the summer and winter season.

ASTRAGALUS, a genus containing plants of the herbaceous biennial, perennial, flowery, and shrubby kinds. The Milk Vetch and Goat's-thorn.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceae*, or *Leguminosae*.

The characters of which are: that the calyx is a one-leaved, tubular, five-toothed, acute perianth; lower toothlets gradually less. The corolla is papilionaceous: the banner longer than the other petals, reflex on the sides, emarginate, obtuse, and straight: the wings oblong, shorter than the banner: the keel the length of the wings, and emarginate. The stamina consist of diadelphous filaments, simple and novemfid, almost straight: the anthers are roundish: the pistillum is a germ nearly columnar: the style subulate, and ascending: the stigma obtuse: the pericarpium is a two-celled legume; the cells bent to one side, having a longitudinal bifid septum, parallel to the valves: the seeds are kidney-shaped.

The species cultivated for the purpose of ornament are: 1. *A. alopecuroides*, Fox-tail Milk Vetch; 2. *A. Christianus*, Great Oriental Yellow Milk Vetch; 3. *A. galegiformis*, Great Oriental Rue-leaved Milk Vetch; 4. *A. Tragacantha*, Common Tragacanth Shrub or Goat's Thorn.

The first is biennial, and rises with an upright hairy stem about two feet high, having long pinnate leaves, with eighteen or twenty pairs of ovate leaflets: the flowers are produced in large close obtuse spikes from the axillas; their colour is yellow: the legumes are shut up in the woolly calyxes, and have two cells, containing three or four square seeds in each. It flowers in June or July, and is a native of Siberia.

The second species is perennial, and has the stems rising nearly three feet in height, which are large at bottom, and gradually diminish to the top

the leaves at bottom are likewise very long, and diminish upward, so as to form a sort of pyramid; these are winged, and composed of many large oval pairs of lobes, which are placed thinly on the midrib, and terminated by an odd one: the flowers come out in clusters from the wings of each leaf, beginning near the root where the foot-stalks are the longest, and continuing upwards, diminishing in number. They are large, of a bright yellow colour, and are succeeded by cylindrical pods opening in two cells, filled with square yellow seeds. It flowers in July, and is a native of the Levant.

The third species has a perennial root: the stems are many, upright, more than five feet in height: the leaves have about fourteen pairs of oval leaflets, terminated by an odd one: the peduncles are axillary, on which are small yellow flowers, in loose spikes, extending beyond the leaves. It flowers in June and July, and is a native of Siberia.

The fourth has a large, woody, and branching root: the stems are a foot long, leafy, branching, and hard: the leaves subhirsute, with from seven to ten pairs of leaflets, and no odd one: the bractes large, yellow, ovate-lanceolate: the flowers upright, at the lower part of the stem, on peduncles, from five to eight, shorter than the leaves: the calyx soft and villous, cylindrical, with long capillary teeth: the corollas are long, stiff, and of a pale violet colour: the banner long, plaited, notched, with veins of deep purple: the wings on a capillary peduncle, with a short blunt hook: keel shorter, with short hooks, and a bent pointed purple beak: the legume is one-celled, with four seeds. It is a native of the south of France, &c.

There are varieties with oval lobed leaves; with spear-shaped lobes; with spear-shaped, pointed, downy lobes; with purple flowers; with red flowers, &c.

Besides these species, there are others in this numerous genus that equally deserve cultivation.

Culture.—These plants are mostly of hardy growth, and capable of being raised with facility in almost any soil or situation.

The first three species may be readily propagated by sowing the seeds in the spring months in the places where they are to grow and flower: some, however, raise the perennial kinds in a bed of good earth, afterwards transplanting them into the places where they are to remain; but the first practice is in general the best.

The second species requires a rather warm situation. The plants do not sometimes flower before the third year when produced from seeds, but in suitable soils they continue a great number of years.

The fourth species, as it rarely produces seeds in this climate, is best produced by layers, cuttings and slips, which should be set in pots of light fresh earth in April when the plants begin to shoot, and then plunged into a moderate hot-bed till the plants rise, occasional shade and water being given, when they should be gradually inured to the open air, to render them hardy and prevent their drawing up weakly.

When raised from seeds, they should be sown in pots at the same time as in the other species, being brought forward in moderate hot-beds, and, when the plants are of proper sizes, transplanted into small pots, proper shade and water being given till they are established. They require the protection of a frame or green-house in the winter season; but a few may be planted out in warm dry situations after they have been two or three years in the pots.

Some plants of the first species should be raised annually, as they frequently die after flowering.

In the fifth species the leaves are retained for a considerable length of time, and when they drop off the foot-stalks remain in the form of sharp thorns for the protection of the plants.

The first three kinds afford variety in the borders and other parts of ornamented grounds, and the fourth may be occasionally employed in the same way, in dry warm aspects, as well as in assemblage with other potted plants, during the summer season; but they mostly require protection in winter.

ATAMASCO Lily. See *AMARYLLIS*.

ATHANASIA, a genus comprising various plants, chiefly of the shrubby exotic kind.

It belongs to the class and order *Syngenesia Polygamia Equalis*, ranking in the natural order of compound flowers, in the division *Discoideæ*.

Its characters are: that the calyx is common imbricate and ovate: the scales lanceolate and pressed close: the corolla is compound uniform, longer than the calyx; the corollules hermaphrodite, equal, and numerous: proper funnel-form; border five-cleft, acute and erectish: the stamina consist of five capillary short filaments: the anther cylindric and tubular: the pistillum is an oblongish germ: the style filiform, a little longer than the stamen: the stigma bifid and obtuse. It has no pericarpium: the calyx is unchanged: the seeds are solitary and oblong: the down chaffy, consisting of very short bristles: the receptacle is chaffy: the chaffs lanceolate and longer than the seed.

There are many species, but the following may be cultivated: 1. *A. dentata*, Tooth-leaved Athanasia; 2. *A. crithmifolia*, Samphire-leaved Athanasia; 3. *A. antrifurcata*, Trifid

leaved *Athanasia*; 4. *A. pubescens*, Woolly-leaved *Athanasia*.

The first has a low, shrubby, branching stem, seldom rising three feet high. The flowers are pale yellow, appearing early in summer, and, if the season prove favourable, are succeeded by ripe seeds in autumn.

There is a variety, in which the corymbs are compound and terminating, the flowers larger, and the leaves broader at the base.

The second species has the stem shrubby and branching like the following. The leaves are linear, divided more than half their length, some into three, others into five narrow segments. The flowers are like those of the next species in shape and colour, and there is a succession on the same plant for a great part of the summer; but unless the season is warm, they are rarely succeeded by ripe seeds in this climate.

The third has the stem shrubby, five or six feet high, dividing into many irregular branches, with flat glaucous leaves, cut at their extremity into three segments, and having an agreeable odour when bruised. The flowers are of a bright yellow colour, and appear in August, but are seldom succeeded by ripe seeds here.

The fourth species rises with a shrubby stem six or seven feet high: the flowers are yellow: the seeds do not ripen in this climate.

Culture.—These Cape exotics, as they seldom or ever produce seeds in this climate, must be propagated by setting the cuttings during the summer season in pots, which should be plunged into a declining hot-bed, and then closely covered with the glasses, being properly shaded in the heat of the day, and supplied with water. After they have stricken root, and are perfectly established, they should be transplanted singly into pots made up with fresh light earth, being placed in shaded situations till they have become well rooted again; they may then be set out in assemblage with other similar plants in warm situations until it becomes necessary to remove them under the protection of frames or the green-house, where they should have as much fresh air as possible when the weather will permit.

ATRAPHAXIS, a genus comprehending two plants of the shrubby kind.

It belongs to the class and order *Hexandria Digynia*, and ranks in the natural order of *Holræceæ*.

The characters are, that the calyx is a two-leaved perianthium; the leaflets opposite, lanceolate, coloured, and permanent: the corolla has two roundish, sinuate petals, larger than the calyx, and permanent: the stamina consist of six capillary filaments, the length of the calyx: the anthers are roundish: the pistillum is a com-

pressed germ: no style: the stigmas two, capitate: no pericarpium: the calyx closed, including the seed. One seed roundish and compressed.

The species are: 1. *A. spinosa*, Prickly-branched *Atraphaxis*; 2. *A. undulata*, Wave-leaved *Atraphaxis*.

The first is a shrub, which rises four or five feet high, sending out many weak lateral branches, armed with spines, and garnished with small, spear-shaped, smooth leaves, of an ash-colour. The flowers come out at the ends of the shoots in clusters, each consisting of two white petals tinged with purple, included in a two-leaved calyx, of a white herbaceous colour, in August.

The second species sends out many slender branches, trailing on the ground: the leaves are small, and oval, being waved and curled on their edges, embracing the stalk half round at their base, and placed alternate. It is a native of the Cape.

Culture.—As these plants do not ripen their seeds in this climate, they must be propagated by planting cuttings in pots of light earth, in the later spring and early summer months. They require the protection of a green-house during the winter season.

ATRIPLEX, a genus containing plants of the herbaceous, esculent, and shrubby ornamental kinds. The *Orache*.

It belongs to the class and order *Polygamia Monœcia*, and ranks in the natural order of *Holræceæ*.

The characters are: that in the hemaphrodite flower, the calyx is a five-leaved, concave, permanent perianthium, the divisions ovate, concave, and membranaceous at the edge: there is no corolla: the stamina consist of five subulate filaments, opposite to the leaves of the calyx, and longer than them: the anthers are roundish, and twin: the pistillum is an orbiculate germ: the style two-parted and short: the stigmas reflex: there is no pericarpium: the calyx is closed, pentagon, with the angles compressed and deciduous: there is one orbicular, depressed seed. In the female flower on the same plant, the calyx is a two-leaved perianthium: the leaflets flat, erect, ovate, acute, large and compressed: there is no corolla: the pistillum is a compressed germ: the style two-parted: stigmas reflex, and acute: there is no pericarpium, but the valves of the calyx are very large, cordate, including the seed between them: there is an orbiculate compressed seed.

The species are: 1. *A. hortensis*, Garden *Orache*; 2. *A. Halimus*, Tall Shrubby *Orache*, or Spanish Sea Purslane. 3. *A. portulacoides*,

Dwarf Shrubby Orache, or Common Sea Purslane.

The first has an annual root. The stem rises three feet in height and more, and is thick and shining. The leaves are thick, pale green, and glaucous, with few veins, of a slightly acid flavour; they differ in shape; some stretch out into a long point from a broad base, being entire about the edge; some are deltoid; others are serrate or sinuate, and others again are triangular. It is a native of Tartary.

There are several varieties of this plant, as with dark green leaves, with dark purple leaves, and with green leaves and purple borders.

The second species has a perennial woody root, dividing into many branches. The whole shrub is white. The stems from four to six feet high or more, with many thick, woody, brittle branches. The leaves irregularly disposed on the branches on long petioles, thick, succulent, somewhat shining, having a subacid flavour. The flowers are small, purplish, at the ends of the branches. It is a native of Spain, &c.

The third is a low undershrub, seldom rising above two feet and a half, or at most three feet high, but becoming very bushy. The leaves are narrow, and of a whitish colour, but not so white as those of the former. In its wild state it varies in height from six inches to a yard. The branches generally recline, are angular, and of a whitish green colour. The leaves are glaucous, opposite, petioled, generally elliptic, some obtuse, others lanceolate. The flowers are yellow, and terminate the branches in clustered spikes. It is a native of Europe, and flowers in July and August.

Culture.—The culture in the first species is by sowing the seeds in beds or drills in the early spring months, when designed for use in the summer season, and in the autumn, soon after they become ripe, when intended to be made use of in the spring. When the plants are come up a few inches in height, they should be set out to the distance of four or five inches or more by the hoe, and be afterwards kept perfectly clean from weeds. In good soils, with sufficient room, the leaves become large and fleshy, and are made use of while young in the manner of spinach, being preferred by some as having a more mild flavour.

The two last species may be increased by planting cuttings in the spring and summer seasons in shady borders or other situations, being either left to grow up, or in the autumn following transplanted into the places where they are to remain. As the plants do not bear moving well when they become woody, it should be done in their early growth.

These plants have an excellent effect in wilderness and other quarters of ornamented grounds, from the fine silvery whiteness of their leaves, when judiciously blended with other shrubby plants of similar growth. The second species grows rapidly, and sometimes produces flowers.

AVENUE, a large and mostly a straight walk, bounded on the sides by one, two, or more rows of forest- or other trees, designed sometimes as a principal way from the common road to a country house or seat, and often to form views, or to lead to different districts of the neighbouring country. But though avenues, when formed about seats, or detached in parks or other extensive pleasure-grounds, may exhibit an air of grandeur, it is more agreeable to the present taste to have the principal fronts of residences entirely open and unincumbered with these or other kinds of plantations, as it is certainly absurd to hide a good front and obstruct the prospect; an avenue can therefore seldom be admitted with propriety in that part of the ground. But in directions from the wings, detached at considerable distances, avenues may perhaps with propriety be occasionally introduced and extended on the sides of spacious lawns, serving by way of boundaries, being backed next the lawns with shrubs and low trees, disposed irregularly; and if they be carried in an oblique direction, the lawns will widen gradually, and the prospects be more pleasing. Avenues may also be admitted at some distance from either the ends or back fronts of the dwellings, in either of which situations they may be extended towards any common road or village, serving as the ordinary entrance to the habitation, or merely by way of ornament.

Extensive avenues should always be planted with the stateliest trees, an assemblage of the different sorts of which effects the most agreeable variety. The width of the avenue in such cases should seldom be less than sixty feet; and when it is to be extended any considerable length, a hundred feet is not too much; as when the trees grow up the branches on the opposite sides continue to approach each other, which by degrees greatly contract the views; so that, if a considerable width be not at first allowed, the avenues in time appear narrow and confined. The trees in the rows on the sides should be planted at least thirty feet distant from each other, that they may have full scope to display their heads, and each sort exhibit itself conspicuously, according to its natural form and habit.

The sorts of trees most proper for this purpose are those of the deciduous tribe, as the

elm, beech, Spanish chestnut, horse-chestnut, white poplar, sycamore, maple, walnut, wild cherry, &c. all of which being of lofty growth, when disposed in a proper manner, have a fine effect. Sometimes evergreens are used among these: where this is intended, the most proper sorts are the various species of the pine, including all the different varieties of the fir, most of which attain a great height and magnitude, with beautiful spreading heads, that are extremely ornamental and pleasing.

But in forming avenues of the more rural kinds, such as common ways or roads through parks or other pleasure-grounds to habitations, they should be continued either in direct lines or carried round in a moderate sweep, or the course directed in two, three, or more very gentle bends, or easy serpentine turns, each side being ornamented with different sorts of trees thinly dispersed, some singly, others in clumps or groups of two, three, or more together, exhibiting them variously, some breaking forward, others standing more backward; and for still greater diversity, a clump of tall flowering shrubs may be here and there introduced, having the whole so considerably detached as to admit a full prospect of the adjacent lawns, fields, or plantations, in the whole extent.

This is the most modern method of forming and planting avenues; but it cannot be practised with full effect, except where the situation is of considerable extent. For walks and confined situations the row method is mostly to be preferred, as having a better effect.

AUTUMNAL Flowers, such as attain perfection in the autumnal season.

AUTUMNAL Plants, are such as attain perfection in autumn, either in their growth, or their flowering, &c.

AUTUMNAL Season, that from the latter end of August to the end of November, in which various operations in gardening are to be performed, such as sowing, planting, and propagating different kinds of seeds, plants, trees, and shrubs; and the putting in various sorts of esculent plants to stand the winter for the ensuing spring and summer, such as *cabbages, cauliflowers, carrots, lettuces, Spanish onions, &c.* in the more early part; and in the latter *beans, peas, coleworts, and early cabbage-plants*; likewise *cauliflowers*, some to remain under hand-and-bell-glasses, others in frames, to stand till spring; also *lettuces* on warm borders and in frames, to stand the winter, and *celery* in shallow trenches, for spring use; and for the making and spawning of mushroom-beds, for winter and spring. It is also the proper period to increase different sorts of fibrous-rooted flower-

plants, by dividing or parting their roots, particularly in the months of September, October, and November, when the flower-stems decay, the slipped or divided parts mostly flowering the following year.

And from the middle of September to the middle or latter end of November is the proper time for transplanting from one place to another different kinds of hardy fibrous-rooted perennials, as directed under their proper genera. Most sorts of bulbous flower-roots, that were taken up in summer, are now planted, in order to exhibit an early spring and summer bloom in the following year. The seeds of many sorts of flowers are likewise at this time to be sown, which do not grow so freely when sown at other seasons, as is shown under their proper heads.

In the latter part of this season it is necessary to plant cuttings and make layers, for the propagation of various trees and shrubs of the hardy kind. The seeds of many sorts of hardy trees and shrubs may also be sown. Besides these, many other parts of garden culture are particularly necessary to be executed at this season.

AURANTIUM, Orange Tree. See **CITRUS**.
AURICULA URSI, Auricula, or Bear's-Ear. See **PRIMULA**.

AZALIA, a genus containing plants of the hardy deciduous flowering shrubby kinds. The Upright American Honeysuckle.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters of which are: that the calyx is a five-parted, acute, erect, small, coloured, permanent perianthium: the corolla is monopetalous, bell-shaped, semiquinquefid; the sides of the divisions bent in: the stamina consist of five filiform filaments, inserted into the receptacle and free: the anthers are simple: the pistillum is a roundish germ: the style filiform, the length of the corolla, and permanent: the stigma is obtuse: the pericarpium is a roundish capsule, five-celled and five-valved: the seeds many and roundish.

The species chiefly cultivated are; 1. *A. multiflora*, Naked-flowered Azalia; 2. *A. viscosa*, Viscid-flowered Azalia.

The first in its native situation often rises to the height of fifteen feet, but is here never more than half that height. It sends out several stems from the root. The leaves are oblong, smooth, alternate and petioled. The peduncles are axillary, long and naked, supporting a cluster of red flowers, which are tubulous, swelling at their base like those of the hyacinth, and contracted at their neck; they are divided at the top into five equal segments, which spread open.

The five stamens and style are much longer than the petals, and stand erect. It is a native of Virginia.

There are varieties of this plant with scarlet flowers; with pale red flowers; with curly white flowers; with red and white flowers; and with variegated flowers.

The second is a low shrub, rising with several slender stems near four feet high: the leaves come out in clusters at the ends of the shoots without order: they are spear-shaped, and narrow at their base; their edges are set with very short teeth, which are rough: the flowers come forth in clusters between the leaves at the extremities of the branches; they are white, with a mixture of dirty yellow on the outside: the tube is an inch long, and at the top they are pretty deeply cut into five segments; the two upper are reflex, the two side ones bent inward, and the lower one is turned downward: the stamens are a little longer than the petals, and support oblong saffron-coloured anthers. The style is much longer than the stamens, and is crowned by an obtuse stigma. These flowers have much the appearance of those of Honeysuckle, and are as agreeably scented; more so

than the foregoing sort. They appear the middle of July, but are not succeeded by seeds in this climate. It is a native of North America.

This plant has varieties, with white striped flowers; with narrow petalled flowers; and with clustered flowers.

Culture.—These plants may be raised without much difficulty, in rather moist soils where the situation is shady. As they never produce seeds in this climate, they must be increased by layers from the young shoots, or by offsets from the roots. The best season for either of these methods is the early part of the autumn, when they should be set out where they are to grow, or be planted in rows in the nursery manner. It is useful to protect the roots during the winter, by covering the ground about them with old tan, or other similar substances.

Where the seeds can be procured, plants may be raised by sowing them either in pots or on warm borders; in the former method, forcing their growth by plunging them in mild hot-beds.

These shrubby plants are suited for affording variety in shrubberies and other places, both on account of their fragrant smell and the beauty of their flowers.

B A C

B A C

BACCHARIS, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ*.

The characters are: that the calyx is common cylindric, imbricate: scales linear, acute: the corolla is compound equal; corollules hermaphrodite and female mixed. Proper, to the hermaphrodite funnelform, five-cleft, to the females scarcely apparent, almost none: the stamina consist of five capillary filaments, very small: the anthers are cylindric and tubular: the pistillum is an ovate germ: the style filiform, the length of the flower: the stigma bifid. There is no pericarpium: the calyx unchanged: the seeds solitary, very short and oblong; down simple: the receptacle naked.

The species chiefly cultivated in the garden are; 1. *B. ivafolia*, Peruvian Ivy-leaved Baccharis, or Ploughman's Spikenard; 2. *B. neriifolia*, Oleander-leaved Baccharis; 3. *B. halimifolia*, Sea Purslane-leaved Baccharis, or Groundsel-tree.

The first grows to the height of five or six

feet: the female florets with a trifid corolla are very abundant; but the hermaphrodites of the disk are few and five-cleft: the scales of the calyx spread very much in a state of maturity: the florets of the disk are barren; of the ray subulate, scarcely toothed, and fertile: the receptacle obtusely conical, alveolate at top, the cells toothleted, but at the sides simply and obscurely scrobiculate: the seeds are small, ovate-oblong, flattened a little, obscurely margined and pale: the pappus or down sparing, twice as long as the seed, scarcely toothed. It is a native of America, and flowers in July and August.

The second species has a soft shrubby stalk, which rises to the height of eight or ten feet, putting out side branches toward the top: the leaves are stiff, having a few indentures toward their top, and placed without order: the flowers are produced at the extremities of the branches in a close spike: they make little appearance, being of an herbaceous colour, and are not succeeded by seeds in this climate.

The third is a herbaceous kind of shrub, six, seven or eight feet in height: the leaves are

many, like those of Goosefoot, but stiffer, irregularly set on the branches. Flowers crowded, naked, at the end of the twigs: they are not very beautiful, but the leaves continue green through the year. It is a native of Virginia, and flowers in October.

Culture.—The first species is capable of being increased, either by cuttings or the seeds: the first should be planted out in shady borders, or in pots in the summer months, and care taken to give water frequently in dry weather, till they be well rooted: the seeds may be sown in borders that are not too much exposed to the sun, or in pots in the early spring season.

As the second sort is not easily increased by cuttings, and seldom sends out shoots from the root to be laid down, the whole head of the plant is sometimes laid down into the ground, being confined there, and the small branches slit as in the culture of carnations: they should be frequently watered, and after they have had a twelvemonth's growth, may be separated and planted out in pots of light earth, being placed in a shady situation till they become well rooted, when they should be managed as other green-house plants.

The third species may be readily raised by cuttings, which should be planted out in a shady bed or in pots, in the spring season, being well watered in dry weather. The young plants may be removed in the autumn, into pots or other places where they are to grow.

The first and third species are somewhat hardy: but the second requires the protection of a green-house in the winter. Some of the other sorts should likewise be cultivated in pots and protected in winter, as they are apt to be destroyed by frost in severe seasons.

These two sorts are often planted in shrubbery and other quarters of pleasure grounds.

BALM. See MELISSA.

BANISTERIA, a genus comprising different plants of the tender exotic kind.

It belongs to the class and order *Decandria Trigynia*, and ranks in the natural order of *Trihilata*.

The characters are: that the calyx is a four- or five-parted perianthium, very small, stiff underneath with tubercles, permanent. There are two melliferous glands under each division of the calyx, except one; they are therefore eight in number: the corolla has five petals, orbiculate, very large, spreading, crenate; claws oblong and linear: they consist of ten filaments, very small, coalescent at bottom: the anthers are simple: the pistillum three-winged, coalescent germs: the styles three, simple: the stigmas are obtuse: the pericarpium consists of

three capsules, running out into a long wing, one-celled, marked at the sides with small appendices, not gaping: the seeds are solitary, covered, and toothed on the lateral edge.

The species principally cultivated in the stove are; 1. *B. angulosa*, Angled Banisteria; 2. *B. purpurea*, Purple Banisteria; 3. *B. laurifolia*, Bay-leaved Banisteria; 4. *B. bracteata*, Cross-armed Banisteria; 5. *B. fulgens*, Flame-coloured Banisteria.

The first has a twining stem, with opposite branches, thickened at the base: the leaves are cordate, angular, the breadth equal to the length, ending at top in a short dagger point, green above, whitish beneath, nearly equal to the petioles, on which and near the leaf are two opposite glands. There are no stipules: the flowers are in opposite axillary umbels: common peduncle elongated; the rays five to seven, an inch long, jointed, having two short opposite bractes. At the insertion of the rays are two small suborbiculate leaves: the corolla is sulphur-coloured. It is a native of the island of Dominick.

The second species has the stems strong and woody, dividing into many branches, which are opposite and twining. It ramps with these over the hedges: the leaves are ovate, sometimes round, an inch long, on short petioles, and making the branch as it were pinnate. There are five or six pairs of these, nearly of the same size with those of the common *Acacia*, but whitish on their under side: the flowers are axillary, in a kind of spike; with the partial peduncles opposite, jointed, and having a pair of very short bractes: the petals are purplish and short. It is a native of the Caribbee islands.

The third sort has the stem shrubby, climbing, with loose, reflex, diverging, roundish, rugged branches: the leaves are petioled, ovate-lanceolate, acute, entire, coriaceous-membranaceous, nerved, smooth: the racemes paniced; terminating branches and twigs decussate, ferruginous-tomentose; peduncles commonly one-flowered, ferruginous, short and yellow: the leaflets at the base of the peduncles two, opposite, minute, and tomentose: the calyx is five-leaved: leaflets ovate-lanceolate, acuminate, with two round, depressed, green glands fastened to the base: the petals are spatulate: anthers elliptic: the germ three-coloured and trifid at the tip: the styles are subulate and short: stigmas dilated, and as it were halved. One of the three capsules is usually abortive: wings three or four times longer than the capsules. It is a native of Jamaica.

The fourth species has much the appearance of the following, but the leaves are more blunt: the

upper branches bear flowers, and are paniced : the inner margin of the winged seed is sharp, the outer blunt : it has no toothlet besides the lateral ones at the base. It sends out many branches, which are subdivided into others, growing without order, and becoming bushy upwards, sending forth tendrils by which they fasten themselves to the neighbouring trees, and climb to a great height. It is garnished with oval stiff leaves, ending in a point. The flowers are produced in tall spikes at the end of the branches, which are first of a gold colour, then fading to scarlet : they are succeeded by slender thin seeds, mostly single. It is a native of Carthage.

The fifth has slender winding stalks, which rise five or six feet in height : the flowers grow in a round bunch at the extremity of the branches, and are of a brownish yellow colour : the seeds are smaller, and have narrower wings than in the third species : the leaves are ovate with a point, villose beneath, shining and smooth on the upper surface. A solitary branch comes forth from the axils, furnished with leaves, producing at top, in a kind of umbel, several filiform, simple, one-flowered peduncles : the seeds are erect, the outer angle decreasing to an edge, the inner more blunt, putting forth a small sharp membranaceous angle next the pistil : by the seeds on each side next the base, are three small appressed toothlets.

Culture.—These plants may be raised by sowing the perfectly ripened seeds, procured from abroad, as soon as they are obtained, in pots of light sandy mould, which in the autumn and winter season should be plunged in moderate tan hot-beds, carefully preserving them from frost and too much moisture till the spring, when they should be removed to a fresh very mild hot-bed just to bring up the plants : when they have obtained a little growth, they should be placed in separate pots of the same sort of earth, and plunged in the bark-bed. If the plants do not appear the first year, the pots should be left till the following, as the seeds are often slow in vegetating. The after culture is the same as that of other tender stove plants of similar growth. They are only cultivated for variety in the stove.

BARBERRY. See **BERBERIS**.

BARK, TANNERS, the astringent cortical substance peeled from oak and some other trees ; which, after being ground and made use of in tan-vats, constitutes a material of great utility in forming hot-beds where a regular heat is required for some length of time, as in stoves, pits, &c. for the culture of various plants of the tender exotic kind.—See **HOT-BED**.

BARK-BED, that sort of hot-bed which is either wholly or principally formed of tanner's bark. Beds of this kind, from their preserving the most uniform and regular degrees of heat, are found by much the most useful in the propagation and culture of all kinds of tender exotic plants that are brought from warm climates, and which stand in need of the continued assistance of artificial heat in this part of the world. Beds of this nature, with a little trouble in the management of them, are found sometimes to support a pretty uniform and regular temperature for a considerable length of time.

These are the kind of hot-beds that are generally employed in hot-houses, being formed in pits or cavities, constructed for the purpose in them, frequently the whole length of the houses ; six or seven feet in width, and three in depth, being inclosed by means of brick-work.—See **BARK-PIT**.

In these beds the pots of such tender exotics as have been mentioned are plunged and supported ; and they at the same time afford assistance in supplying such houses or stoves with those degrees of heat that may be proper for the growth and support of various other plants that do not require to be plunged into the beds, the heat of the surrounding air, produced in this way, being sufficient for their growth and preservation. Thus, by the aid of bark heat, and that of fire during the severity of the winter season, the gardener is enabled to imitate, within the hot-house, the temperature of distant climates, and not only to cultivate and bring to perfection the pine-apple, but also various other tender plants from different quarters of the globe, both of the herbaceous and woody kinds, and to exhibit them in their most healthy and beautiful states of growth in this country.

Bark hot-beds are likewise occasionally formed in pits constructed for them, in the open ground, separately, and detached from hot-houses. These are walled round with bricks, chiefly above the surface of the ground, having a frame or coping of wood upon the top, on which glass lights are fixed, so as to slide with facility.—See **BARK-PIT**.

In these pits the bark-beds are made to the depth of three feet or more, in order to afford an uniform and lasting heat, for the purpose of raising and propagating different sorts of tender plants from seeds, suckers, layers, cuttings, &c. both of the stove and green-house kinds, as well as those of the natural ground. Such beds are of course of great utility where there are large collections of tender exotic plants, and as nursery-pits for young pine-apple plants

to supply the stove or pinery annually. See *Stove*.

Beds formed of bark are also employed with success in raising various sorts of early productions of other kinds, as early strawberries, melons, peas, French beans, &c., which, by the regular and moderate heat which they afford, are mostly brought forward in the greatest perfection. They are likewise made use of in forcing different sorts of curious flowers, both of the bulbous, tuberous, and fibrous-rooted kinds, into early blow; as hyacinths, dwarf tulips, narcissuses, jonquils, anemones, ranunculuses, pinks, &c.; also many plants of the small shrubby kinds, as roses, hypericums, &c.

Bark-beds are also employed with great advantage in forcing-frames, for the purpose of producing early fruit of the apricot, peach, and grape kinds. See *FORCING-FRAMES*, and *HOT-WALLS*.

Hot-beds constituted of bark, from the slow and regular manner in which the heat is in common evolved, are not so liable as those of dung to injure the plants by their steam: they are therefore to be preferred for all the more important purposes of forcing, where the material can be obtained.

The heat of them may be perpetuated for a great length of time, by having recourse occasionally to the practice of forking or turning them over, adding in such operations about a third part of new tan or bark. The beds are however to be wholly, or in a great part, renovated every autumn or spring.

There are different sorts or sizes of bark made use of for the construction of these beds, as coarse, middling, and small. The first kind is the longest in taking on heat, and is apt to heat violently at the beginning, but is of the longest duration. The second sort heats sooner, is more regular, and pretty durable in its effects. But the last kind heats the quickest, yet it is the weakest, and soonest becomes earthy; consequently the least proper for the purpose. Where there is a choice of the material, the middle sort, or a mixture of it and the coarse, should constantly be preferred, admitting as little of the small as possible. And care should be taken that it be perfectly fresh from the vat of the tanner. When the bark is wet after being brought home, it is a good practice to throw it up into heaps or ridges for a few days, in order that it may be drained and rendered more dry, as without such precaution the process of fermentation may be too much retarded.

The periods of making beds of this nature must be regulated by circumstances; but where they are intended for pine-apple plants, they

should be prepared about the latter end of September or beginning of October, in order that they may afford a good heat during the winter season; but when the raising of plants from seeds, cuttings, &c., or the forcing of culinary vegetables and fruits, or flowers, are the principal objects, the latter part of winter, or the early spring season, may be the most suitable times, as in January, March, or the following month. For particular uses they may however be made at any period. For the methods of forming and managing them, see *HOT-BED*.

BARK-PIT, a pit or cavity of a long, square, or other form, made to the depth of three or four feet or more, in the hot-house, stove, or other situation, in which to make tan or bark hot-beds. The width may be four, five, or six feet or more, having length in proportion to that of the hot-house, &c. When made in a detached manner they may be of such sizes as are requisite for the particular purpose in view. They are formed by a low surrounding brick wall, about three feet in height, in such pits as are in the houses, and in the others three or four feet in front, by four or five in the back.

Pits of these different sorts are indispensably necessary, where bark-beds are to be made, as the loose nature of tan will not admit of being formed into compact regular beds, without the aid of such kinds of enclosures to confine it in.

Bark-pits are necessary for various purposes in hot-houses and stoves, as well as occasionally in forcing-houses, &c. And bark-pits distinct from hot-houses are likewise useful in extensive gardens on many occasions, being of great advantage in the culture of many sorts of tender exotics, and in rearing various kinds under different methods of propagation, as well as for raising and nursing those of similar kinds in their young and tender growth. They are also useful for forcing and raising early productions of several sorts of hardy plants in the greatest perfection.

Pits of this kind mostly extend lengthways, and occupy nearly the whole bottom space of the houses, only about two feet on each side and at the ends being left for a walk round between the outward walls and those of the pits, which should be but very little sunk below the general surface of the floor of the surrounding path; the bottom or floor being paved with brick, stone, or some similar material, and the tops of the walls of the pits well coped with wood or stone. The bark-beds are made to the whole width, length, and depth of these pits, and serve to plunge the pots of the more tender exotic plants in, such as the pine-apple, &c., in order that they may have the benefit of a kindly moist heat

immediately about their roots; and at the same time the advantage of a warm vapour for heating the internal air, assisted by fire-heat in the flues in the winter season, but which in summer and autumn is sufficient alone; producing, from the beginning of spring till October, an effectual temperature of internal heat, for the preservation and growth of almost all such tender exotic plants as are natives of different parts of the hot regions of South America, Asia, and Africa.

Hot-houses or stoves of the common width have in general only one pit extending lengthways of them, as described above; but if they are of considerable extent in length, the pits are sometimes divided in the middle, or at other parts, by intervening passages, to render them more convenient in performing the necessary culture of the plants. Some hot-houses of very great width have likewise two bark-pits ranging parallel lengthways with a passage extending between them, which renders them more commodious in giving the requisite culture to the plants that are plunged in the beds, than if the whole was in one extremely wide pit, in which it would often be very inconvenient to come at the plants placed towards the middle; and by having an intervening passage, give a larger scope, and afford a better current of air for the growth of the plants in the beds, as well as admit of viewing them to much greater advantage and effect.

Detached or external bark-pits are such erections as are formed separate and distinct from hot-houses or stoves, but in some manner connected with them, being employed for similar uses, as well as for various other purposes where occasional artificial heat is wanted. They are made, as has been just observed, four, five, or six feet wide, having such lengths as may be required, formed by surrounding walls of brick-work, three or four feet in height in the fronts, by four, five, or six behind, where sometimes flues for winter fire-heat are erected in the upper parts, the whole being coped and covered at top with moveable glass frames sloping southwards to the full sun, and in which a bark-bed being made to the whole width, length, and depth, becomes an useful appendage to the stove, greatly assisting in the culture of various tender exotics of that repository, especially in the way of nursery-pits for raising and preserving them to some advanced state of growth; also occasionally in the propagation and protection of the more tender kinds of green-house plants, or any particular curious or tender plant of the full ground, as being always ready, and prepared with a continuing growing heat, in which to

plunge the pots, where artificial heat is required, or essentially necessary in raising such tender plants more effectually and expeditiously. These kinds of bark-pits also prove exceedingly useful in raising many sorts of tender exotics from seeds, suckers, cuttings, slips, &c., and in retaining and forwarding them in their growth for some time. Bark-pits of this kind are likewise, as has been seen, particularly useful and necessary in the culture of young pine-apple plants; for rearing and nursing them till of a proper age and size to be placed in the succession-house, fruiting-stove, or pinery. Similar kinds of detached bark-pits are likewise occasionally used with advantage in planting, transplanting, and shifting tender or curious plants in pots; for plunging the pots which contain them in as soon as replanted, which much expedites their taking fresh root, and brings them up at first into a free and vigorous growth. Bark-pits of the same kind are also successfully employed in forcing and raising early productions, such as melons, kidney-beans, peas, strawberries, &c.; and for many sorts of flowers, both of the bulbous-rooted and herbaceous kinds, as well as for small flowering shrubs. And if the dimension of them be sufficiently increased, especially in height in the back parts, they may be made use of for several sorts of dwarf fruit-trees in pots, in order to the production of early fruit. Detached bark-pits should always be erected in warm dry situations, in a southerly aspect, and be constantly ranged lengthways in the direction of east and west, or nearly so, in order to have the whole fronts incline fully to the south sun, in a sloping manner, on which to place the glasses in the same position, being placed either contiguous to the hot-houses or stoves, but at a proper distance in front of them, as the situation or convenience of the place may admit, or at one or both ends, extending in a line with them, but separated by a passage between them. But detached bark-pits are sometimes formed with ridged tops, like the roofs of houses, the glasses sloping to both sides, being ranged lengthways north and south, in order to have the benefit of the sun equally on both sides, and used for the same purposes as the others; though the common south-fronting pits are more generally employed, as being less expensive in glass, and in common more convenient for purposes of the forcing kind. They should be constructed, as has been observed, with brick walls, on the sides and ends nine inches thick; and where fire-flues are intended, the back walls should be of a proper thickness from the bottom, to admit of having them in the upper parts, a fire-place being contrived externally at the bottom at one

end ; or in considerably extended pits, a double fire-place may be formed in the middle, behind, or at each end, as most convenient.

Detached pits are sometimes formed of wood only, by means of posts and planking, serving for particular purposes where no fire-heat is required. In such kinds of pits, where additional heat is occasionally necessary, it is effected by applying a strong lining of hot dung to the outside, by which a good constant heat may be supported. In these bark-pits sometimes the younger pine-apple plants are deposited and nursed for the first year : they may likewise be occasionally used for the purposes of propagating, raising, and nursing tender plants and flowers in spring and summer, as well as for forcing early esculent crops. The principal detached bark-pits should, however, always be formed with brick walls, as being the most effectual for general use, and of the greatest duration. See **HOT-BEDS**.

At figs. 1, 2, 3, and 4, in the plate on bark-pits, are seen the most improved forms and constructions of these sorts of pits.

BARK-BOUND, a supposed vegetable disease in fruit- and other trees. It probably depends upon the imperfect growth of the plants. The general mode of removing it has been by making incisions through the bark in a longitudinal direction from the top of the tree or bough to the bottom, in the very early spring season, the gaping, when considerable, being filled up with some composition of an adhesive nature. Caution should however be employed in making such incisions, and more attention be had to the state of the roots, as injury instead of advantage may sometimes be produced by such means.

BARK-GALLED, an affection produced in the bark of trees and plants, by their rubbing against other plants, or the stakes to which they are tied for support. It may be removed by binding some adhesive soft material on the part by hay ropes. In binding trees to supports, care should always be had to introduce a portion of the rope between the tree and the support to which it is to be fastened.

BARLERIA, a genus comprehending different plants of the tender perennial exotic kind.

It belongs to the class and order *Didymamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are : that the calyx is a four-parted permanent perianthium ; two opposite leaflets larger : the corolla is monopetalous, funnel-form, quinquefid, subequal : the fifth division deeper : the stamina consist of four filiform filaments ; two very short and capillary :

the anthers, the upper oblong, the lower withered : the pistillum is an ovate germ : the style filiform, the length of the stamens : the stigma bifid : the pericarpium is an acute, flat-quadrangular, two-celled, two-valved capsule, gaping elastically at the claws : the partition contrary : the seeds two, compressed, and roundish.

The species principally cultivated in the stove are : 1. *B. solanifolia*, Solanum-leaved Barleria ; 2. *B. prionitis*, Prionite Barleria ; 3. *B. luxifolia*, Box-leaved Barleria ; 4. *B. coccinea*, Scarlet Barleria.

The first has the stem bluntly quadrangular, erect, and hispid. The leaves are opposite, lanceolate-sword-shaped, quite entire, thrice the length of the internodes. The flowers are in whorls and axillary. The spines of the stem are three on each side, the length of the whorls. It is a native of the East Indies.

The second species has the stem herbaceous, round, and stiff. The leaves are opposite, running down the petioles, and pubescent underneath : between the branch and the leaf is a spine with four sharp rays from the same centre. The flowers sessile in the axils. The calyxes acuminate-spiny. Two of the four stamens very small at the bottom of the corolla, with little anthers. The capsule has a longish solid point, and bursts without internal elastic points. It is a native of the East Indies.

The third has shrubby stalks, five or six feet high, with strong spines under the leaves. The flowers are produced in whorls towards the upper part of the stalk ; these are succeeded by short seed-vessels containing three or four flat seeds. It is a native of Jamaica, &c.

The fourth has the stems smooth, and four feet high. The flowers are scarlet, in whorls at the joints, appearing from July to September, and succeeded by short pods inclosing flat seeds. It is a native of South America.

Culture.—These plants may be increased by seeds, layers, and cuttings, according to the kinds. In the first, third, and fourth species, the seeds should be sown in pots filled with light fresh earth, in the spring ; and in the autumn, when the plants are sufficiently strong, they should be removed into separate pots ; which must be plunged into a moderate bark-hot-bed, in which they must be constantly retained. When they produce seeds, they frequently sow themselves in the pots which are near them.

The second sort, as well as the others, may likewise be raised by laying down the young shoots in pots during the early summer months, proper shade and moisture being given until they have stricken fresh root. In the following autumn they will be ready to be transplanted out

into separate pots, to be placed in the bark-pit of the stove. When cuttings are employed in the second sort, they should be taken off the young shoots at the above period, and made into lengths of five or six inches, being then planted in pots of light earth, and immediately plunged in a moderate hot-bed, being removed in the autumn to the tan-bed in the stove.

They all require a free admission of fresh air when the weather is fine, and in the summer season frequent watering will be necessary.

These plants afford variety in the green-house and stove, and some of them are so hardy as to stand the open air in warm situations.

BASKET, Garden-, a contrivance formed of small osier twigs or shoots interwoven with each other, made for the purpose of receiving various sorts of garden vegetables and fruits. They should be of different kinds and sizes, in order to answer different intentions, and capable of containing quantities from a quarter of a peck gradually up to a bushel or more.

And in order to suit different uses they should be of different forms and shapes; some smaller sorts made flat and shallow, of different sizes, both with and without handles; others of the smaller kinds deeper, either with rounding or flat bottoms; some with a small cross handle, others without; and larger kinds still wider and deeper.

Such as are intended for gathering many kinds of smaller articles, as the several sorts of salad-herbs, soup-herbs, and other similar productions, that are required only in small or moderate quantities at a time, should be had in regular sets of different sizes; of the smaller sorts, as round shallow chip or osier, of from about eight or ten to fifteen or eighteen inches width, by two or three to five or six inches in depth, or a little more; and the first kinds may either be in common without handles, or those of the larger and deeper sizes may have low cross handles, as is most convenient.

But for gathering the larger productions of the principal crops, as cabbages, cauliflowers, celeris, and other similar kinds; and the different sorts of large esculent roots, as peas, beans, &c., which are usually required in considerable quantities, they should be large strong osier baskets, of much wider and deeper dimensions, and of different sizes, to hold from the quantity of a peck to a bushel, made in proper forms, with suitable handles according to their uses.

Some of those called sieve baskets may also be convenient on many occasions: they are mostly made of a low form, being equally wide at the bottom and the top, and from ten or twelve to fifteen or eighteen inches over, by eight or ten

to twelve inches deep, but without handles. These are well adapted for gathering and sending the larger quantities of particular sorts of fruits, such as cherries, gooseberries, currants, grapes, plums, pears, &c. to market, or occasionally, with the smaller sorts, for peaches, nectarines, apricots, and other kinds of the finer sorts of fruits, each different kind being mostly put in a separate basket.

When it is intended to send these sorts of fruit to any distance, they should not be filled above the brim, and be covered at top, either with leaves, fern, or a little clean hay; and thus, when conveyed many together, those of equal size may, if necessary, be placed one upon another, without fear of their pressing detrimentally upon the fruit; as in this manner vast numbers of baskets are often sent, packed together, by boats and other conveyances to the London markets.

And for sending some of these more delicate sorts of wall-fruit, as peaches, nectarines, fine plums, &c. they are put up in similar-formed but smaller baskets, as in those of three, four, or five inches deep, without handles; and these packed together in one of large deep dimensions.

For family use, to send considerable portions of different sorts of kitchen-garden productions, fruits, &c. to any distance, one or more large, wide, deep, osier basket is necessary, made round or oblong, or in the manner of a hamper, and furnished with a top cover, fixed to one side, with a sort of withy hinge.

Baskets of this larger kind are likewise exceedingly useful for various other purposes in gardens, in containing and carrying particular articles; as in the business of planting and transplanting, to contain and carry the respective sorts of plants, roots, sets, &c. to the places where they are wanted. Similar kinds of baskets are also very useful in the business of hand-weeding in walks, beds, borders, &c. to contain and carry off the weeds, as well as for removing heaps of weeds, litter, and rubbish, where a wheel-barrow cannot be conveniently admitted or employed for the purpose.

For gathering and containing different sorts of fruit, different-sized baskets are also necessary.

Where there are collections of different fruits, the baskets should be of proper sizes, adapted for smaller and larger kinds; as for gathering the daily supplies of the several sorts of smaller fruits, as cherries, strawberries, raspberries, mulberries, gooseberries, currants, grapes, &c. regular sets, in several sizes, of small round white chip, or neat osier, may be proper; those from six or eight to ten or twelve inches wide, and from three or four to five or six inches

deep, being more eligible than larger, in which occasionally may be gathered some of the above different sorts in separate baskets, and these placed together in a larger wide flat basket to carry them for the table, &c. and for larger kinds of choice fruit, as apricots, peaches, nectarines, plums, figs, pears, &c. a similar set of small baskets would also be very convenient to gather the fruits in to the best advantage; or sometimes to gather some particular sorts in separate smaller baskets, as being not so liable to bruise as when too many are placed together in baskets of larger sizes.

A small sort of narrow, upright, chip basket, called pottle, is useful for conveying some smaller sorts of ripe fruit in, &c., and for which purpose they are much used in the gardens in many places; as for strawberries, raspberries, mulberries, and sometimes for early cherries, gooseberries, currants, and choicer sorts of early plums, &c. as the fruit is not so liable to bruise, as when placed together in great quantities in large baskets.

When fruit is intended to be sent to a distance, or for market, in large quantities, in these small baskets, they are packed together, upright, in a large, wide, flat, osier basket, and in that manner often carried upon the head, as not being so liable to bruise as by other methods of conveyance.

Flag hand baskets are likewise useful in gardens in gathering particular sorts of vegetable productions, as well as the hardier sorts of fruit, and for sending small portions of different sorts to a moderate distance. These baskets are also useful in gathering some sorts of hardy fruit by hand, on high standard trees, such as apples, pears, &c. and green walnuts for pickling, &c.

And sometimes in removing for transplantation some curious sorts of largish ever greens, &c. into the full ground, with balls of earth about their roots, to be sent to a distance with them as entire as possible, that the plants may scarcely feel any check, large, strong, coarse, willow baskets, not very closely worked, are useful to place the plants in separately.

Baskets for the use of the market-gardeners are of several sorts and sizes, peculiar to themselves, for gathering and carrying their productions into market, for which they have different terms, as *maunds*, *junks*, *sieves*, *boat-baskets*, *bushel-baskets*, and *barge-baskets*.

Most of the different sorts of baskets for garden uses may be procured of the basket-makers.

BASON, an excavation made for the purpose of containing water, either for use or ornament, in gardens or pleasure-grounds.

Basons of this sort are often necessary and con-

venient in gardens for watering plants in summer, particularly such as are obliged to be planted out in time of drought, as well as beds of young seedlings, of any sort, in dry seasons; and plants in hot-beds under glasses; also all sorts of plants in pots; as the water exposed to the influence of the sun and air in these ponds is considerably more salutary to the growth of vegetables, than such as is drawn immediately out of wells.

Where basons for containing water are formed for ornament in pleasure-grounds, they should be introduced in some of the more conspicuous situations, especially in the lower parts, and where a proper supply of water can be most readily obtained, either naturally, or by being conducted from a distance, sufficient to continue them constantly full to the requisite height. If possible they should be at some distance, but within view of the house or habitation, and the principal lawns and walks that are contiguous to it, and have intervening views from other parts of the ground; especially where the surface of the water is of considerable extent; but in small basons this is not material, as they have but little effect.

In regard to form and dimensions, they must vary according to circumstances: but where regular basons are intended, they may either be circular, oval, or any other shape, being proportioned in some degree to the nature of the situation, or part of the pleasure-ground in which they are formed, as well as to the supply of water that can be obtained.

When it is desired to have basons of water formed, so as to imitate nature, they may have bends, swells, and curves of different dimensions; and in some situations be made to imitate lakes, rivers, &c.; the extreme parts being sometimes turned in bold sweeps between projecting side plantations, so as that the termination may in a manner disappear, and seem in some points of view to extend in another direction.

The principal circumstances to be attended to in making basons, or pieces of water, are a proper supply of water at all times of the year, and the making them hold water perfectly at all seasons.

The first must depend upon situation; and in regard to the second, the most effectual method is puddling, or laying the bottom and sides of the cavities with strong well-wrought clay, twelve, fifteen, eighteen inches, or even more, thick, according to the quality of the natural soil; as the more the sub-soil inclines to a light loose texture, as gravel or sand, the greater thickness of clay should be allowed. Where the sub-soil is of a strong loamy or clayey kind, there is little

danger of its holding water naturally, or by a moderate thickness of clay being added.

When clay cannot be easily procured for the purpose, chalk is sometimes made use of in countries where it abounds, being first formed into a powder, and then wrought up into a sort of mortar, and applied over the bottom and sides, beating and ramming it hard as it is laid on.

And instead of clay, the bottom and sides are sometimes formed a foot thick with brick, or small stones laid in terrass, and plastered over with two or three inches thickness of cement, composed of two-thirds of powdered tiles to one of lime, which is beaten well, with as little water as possible, into a strong mortar. This is however an expensive method.

The depth of basons, or ornamental pieces of water, need not in general be more than three, four, or five feet at most, even where a boat is intended, or fish to be kept for breeding.

In forming the sides of the cavities or basons, they should have a gradual slope from the top of the circumference to the centre of the intended depth. And when the coat of clay has been applied, a few inches in thickness of gravel should be laid over it in order to preserve it, and render the water more clear: the surface of the surrounding ground should then be laid with turf, from the edge of the water to a suitable distance each way.

The raising of high banks or stiff slopes, as boundaries to basons of this sort, should always be avoided as much as possible; and where the water will admit, the ground should be sloped off gradually from some distance on the sides to the intended surface of water, so as that the superficies of the circumference, or rim, may correspond more perfectly with the general surface of the surrounding ground, and be more easy and natural; the whole surface of the water appearing as conspicuous as possible at a distance, being so managed as always to seem nearly as high as the superficies of the margin of the reservoirs.

In staking out the dimensions of the basons, where full coats of clay are necessary, it is requisite to set them out three feet and a half, or more, according to circumstances, wider than their intended widths, to allow for the suitable thickness of clay being laid on the sides, as well as for the gravel over the clay: they should also have depths in the same proportions.

Particular care should be taken to stake the superficies of the circumference perfectly level, that the water may appear regular every way at the margin.

In digging out the cavities of the basons, the

best method is to begin towards the middle, and excavate the earth to the intended depth; then to work off the sides regularly with a moderate slope from the edge of the circumference to the bottoms of the reservoirs.

When the cavities of the basons have been formed, they should be well rammed and smoothed: then the clay brought in, which should have been previously well wrought over and trodden. Then begin by laying the bottom in the middle, being careful that no extraneous matters be mixed with the clay to occasion cracks or fissures, spreading it regularly, a little at a time, and treading it well with the naked feet, watering it frequently during the process, and ramming it also from time to time with wooden rammers, every part being well kneaded that they may be perfectly compact and secure. During the operation, if the weather be dry, the clay should be covered, as it is laid, with mats or moist litter, or with the intended stratum of gravel, in order to prevent it from cracking, continuing the claying regularly each way from the bottom, till the whole is covered; the water being then admitted. The work is afterwards to be completed by turfing the sides and slopes from the level of the water to such distances as may be necessary for producing the proper effect.

It is obvious that the forming of basons of this nature must be more expensive when made in such soils as are open and porous, than in such as are stiff and retentive, from the greater trouble and labour in claying them. This point should therefore be attended to before the work is begun.

The expense in digging out the excavations may be estimated at from nine-pence to eighteen-pence the yard, according to the nature of the soil and other circumstances.

BASS, a sedgy substance drawn from bass-mats, of which threads or strings are made that are extremely useful in the culture of various herbs and plants, as being the most cheap and ready for the use of gardeners in tying them up.

It is the best sort of bandage in grafting and budding; also for the tying up the stalks or stems of most kinds of flowering plants, the leaves of early cabbages, lettuces, endive, &c. to whiten and promote their heading; also for bunching up various sorts of pot- and other herbs, as well as for many other uses.

The Bass for these purposes should be quite fresh, and not taken from such old mats as have been used in the garden: where there is much tying, it is best to appropriate a mat or two entirely to this purpose, keeping them in the dry, and not drawing the Bass, as is often

practised, from the mats that are designed for other uses; which soon spoils them.

It should be drawn out regularly when it is wanted, and cut into equal lengths; and in order to render it more pliable and tough, dipped in water; then tucked in the apron-string of the gardener, where it will be most ready for being employed.

BAY. See LAURUS.

BEAN. See VICIA FABA.

BEAN, KIDNEY-. See PHASEOLUS.

BEAR-BERRY. See ARBUTUS.

BEAR'S-BREECH. See ACANTHUS.

BEAR'S-EAR. See PRIMULA AURICULA.

BED, a space of ground, three, four, or more feet in breadth, with length in proportion, formed in gardens for the more convenient culture of various sorts of crops, being mostly bounded by trodden paths. They are particularly useful in sowing and pricking out different kinds of small seeds and plants, affording much facility in the business of weeding, thinning, watering, covering, and gathering them. Where a greater depth of mould than usual is necessary, as in the common culture of Asparagus, &c. they afford the means of procuring it, by being raised above the general level of the surrounding ground.

Beds intended for the cultivation of asparagus, strawberries, onions, leeks, lettuces, endive, early radishes, and various other small seed crops, should in general be formed to the width of about four feet, having paths or alleys between them of different breadths, according to their nature; in the first mostly from a foot and a half to two feet, and in the others from half a foot to a foot.

In the culture of cauliflowers, brocoli, different sorts of cabbages, boorcole, and other similar plants, such kinds of beds are likewise extremely convenient for sowing and pricking out the young plants upon, previous to their being set out. In the growth of many sorts of pot-herbs, as mint, thyme, sage, marjoram, savory, penny-royal, tansy, tarragon, balm, hyssop, rue, &c., they are not only convenient, but afford a neat and regular appearance.

In the cultivation of plants of the flower kind, beds are also highly useful both for the ease of performing such operations as are necessary in promoting their growth and flowering, and for the convenience of viewing them. Some sorts also show to much more advantage when planted in beds.

For the different bulbous-rooted sorts, as hyacinths, tulips, lilies, &c. from three feet to three feet and a half are good breadths, with foot and half or two feet alleys; but for ranun-

culuses, anemones, crocuses, pinks, carnations, and various other kinds of the more choice flowers, three feet in breadth, with foot and half paths, are sufficient. Beds for this purpose are mostly edged in a neat manner with box or thrift. These kinds of beds are likewise the most proper and convenient for raising different sorts of flower plants upon, either from seeds, parting the roots, slips, or cuttings.

In nursery grounds for the rearing and growth of trees, shrubs, and other plants, beds of different dimensions must be employed; but for those of the low and smaller growth, those of four feet in breadth, with foot and half paths, are very convenient.

In forming beds of this sort, they should never be raised above the level of the natural ground, except where it becomes particularly necessary, either from the nature of the plants to be cultivated, or the too great retention of moisture in the soil, as, where they are much raised, the mould not only parts with its natural moisture too quickly in dry seasons, but the paths, by being much sunk, have a disagreeable appearance.

Particular constructions of beds are often requisite in the culture of particular sorts of plants, but these will be described in speaking of their culture.

BEECH-TREE. See FAGUS.

BEEF. See BETA.

BEGONIA, a genus comprising a plant of the shrubby exotic kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Holoraceæ*.

The characters are: that in the male flowers there is no calyx: the corolla has four petals, of which the two opposite ones are larger, commonly roundish: the stamina have numerous filaments, fifteen to one hundred, inserted into the receptacle, very short, sometimes united at the base: the anthers are oblong and erect.

The female flowers are usually on the same common peduncle with the males; there is no calyx: the corolla consists in most species of five petals, in some six, in others perhaps four, commonly unequal. The pistillum is an inferior three-sided germ, in very many winged: the styles in most three, and bifid: the stigmas are six: the pericarpium is in most a three-cornered, winged, three-celled capsule, opening at the base by the wings; some are two-celled, and others perhaps one-celled.

The species principally cultivated is *B. nitida*, Shining-leaved Begonia.

In this species, the stems are almost upright, branched, round, smooth, as is the whole plant,

with alternate cylindric branches: the leaves are acute or acuminate, almost entire or obscurely toothed, seven-nerved; one lobe of the base is double the size of the other; the younger ones are rose-coloured about the edge; they are all very smooth and shining, of a bright green colour, paler beneath, permanent, spreading, four or five inches long, and two or three inches broad: the petioles are cylindric, thick, spreading, one-third only of the length of the leaf: the stipules are sessile, oblong, one-nerved, and as it were three-winged, from a rib winged underneath produced into a point; on the sides membranaceous and revolute; they are spreading, deciduous, and the length of the petiole: the racemes are compound, cymose, androgynous; the males very numerous; the females few at the top, solitary, axillary, on long peduncles, dichotomous, three inches wide: the peduncles upright, cylindric, longer than the leaf, the thickness of the petiole: the bractes opposite, below the dichotomies and the pedicels, half embracing, ovate or roundish, membranaceous, caducous: the corolla is flesh- or rose-coloured, sometimes of a dark red; in the female flowers six-petalled: It is an elegant shrub flowering from May to December, and is a native of Jamaica.

There are varieties with rose-coloured flowers; and with white flowers.

Culture.—These plants may be raised either by seeds, layers, or cuttings. The seeds should be sown in pots of light earth, in the early spring season, and brought forward by being plunged in a moderate bark hot-bed. When the plants have attained sufficient strength, they may be removed into separate pots, and placed in the stove.

In the second method the layers may be laid down in the early spring, and be taken off in the autumn, and planted in separate pots. The cuttings may likewise be planted out in the spring months, being transplanted into separate pots after they have become well rooted, and then placed again in the stove. The plants succeed well when kept in the bark-stove, or even over the flue of the dry stove, being very ornamental both in their leaves and flowers, which appear in the summer.

BELLADONNA. See *AMARYLLIS*.

BELLIS, a genus containing an elegant little perennial plant. The Daisy.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are that the calyx is common hemispheric, upright: leaflets ten to twenty

in a double row, lanceolate and equal: the corolla is compound radiate: corollules hermaphrodite, tubular, and numerous in the disk: female ligulate, more in number than the leaves of the calyx in the ray. Proper of the hermaphrodite funnel-form, five-cleft: of the female ligulate, lanceolate, scarcely three-toothed: the stamina of the hermaphrodite filaments are five, capillary, very short: the anther cylindric and tubular: the pistillum is an ovate germ: of the hermaphrodite the style is simple: the stigma emarginate: of the female, the style is filiform: the stigmas two, patulous: there is no pericarpium: the calyx unchanged: the seeds solitary, obovate, and compressed: no down: the receptacle naked and conical.

The species which affords the cultivated varieties is *B. perennis*, Common Perennial Daisy.

This is sufficiently distinguished by its perennial root; truncate or præmorse at the end: the leaves are radical, inversely ovate or lanceolate, or rather spatulate, blunt at the end, notched and often waved about the edge, an inch or more in length, and about half an inch in breadth: scapes hirsute, solid at bottom, hollow at top, from two to four inches long, having sometimes a single leaf, and terminated by one radiate flower, frequently near an inch in diameter: the florets in the disk yellow, numerous (one hundred and fifty); in the ray white, often purple on the outside, and sometimes at the tip, amounting frequently to near fifty in number: the receptacle is surrounded by very small tubercles, which perhaps may be nectaries: the seeds are cordate-oblong or emarginate, compressed, surrounded by a whitish rim, bay-ash-coloured in the middle, having a few whitish hairs on them. It is a native of most parts of Europe; flowering almost all the year, shutting up in the night and in wet weather.

The Garden Daisies are all varieties of this species arising from cultivation, &c. They are very numerous: but the principal are the double white; red; white and red striped; variegated; scarlet and pied: double-quilled, or with fistular florets: double cock's-comb-shaped, white, red, and speckled: and the proliferous, childing or hen and chicken daisy, which is very curious.

Culture.—All the cultivated varieties of the Daisy are hardy, and succeed in most sorts of soils and situations, but in the most perfection in such as are of a mellow loamy nature, and which have not been enriched by manure. In this, they are capable of being increased and preserved, without varying, by parting and transplanting the roots annually in the autumnal or

very early spring months. Where they grow slowly, transplanting them every other year may be often enough. In performing this business care should be taken to select the largest, fullest, and best double varieties, rejecting all such as show any tendency to degenerate. Though the smallest portions will grow, it is the best practice not to divide them too much, as they produce a better show, and are not so liable to be destroyed by the summer heats. They should be planted out where they are to remain; or, if a large supply be necessary, the small slips may be planted together in rows in beds, six or eight inches apart each way. If they be planted in a warm sunny exposure, their blowing in the spring is considerably promoted. This is the method commonly practised in order to bring them early for sale in the markets.

Some plant them as edgings to beds, borders, or other divisions in gardens; but, from their being liable to be destroyed in the summer by heat, they are not well adapted to the purpose. Mr. Curtis, however, thinks that they produce a good effect in this way, and advises that they should be taken up in the beginning of the autumn, and then divided into single plants and set in trenches, three inches from plant to plant, and not put in holes by the dibble, the fibres of the roots being spread out, and the earth pressed closely to them. In this way they are less liable to be disturbed by worms. This work must be done every year, or the plants are apt to spread too much where they grow well.

These plants produce much variety and effect when properly distributed in patches in the fronts and other conspicuous parts of the borders and clumps of pleasure-grounds and gardens, in assemblage with other perennials of similar growth.

BELT, a stripe or breadth of land, planted with trees and shrubs on the sides or other parts of pleasure-grounds, for the purpose of ornament or shelter.

In forming plantations of this sort, attention should be had to different circumstances; such as situation, surface, ornamental effect, shelter, division, and the covering of such objects as may be wished to be concealed.

In the business of planting them, such a mixture and variety of trees should be introduced, as may afford the most agreeable and ornamental effects at all the different seasons of the year. In the arrangement of the plants, those of the largest and tallest growth should occupy the middle and back places; the fronts and more conspicuous parts being filled up by those of the less elevated and more shrubby growths.

All the deciduous and finest kinds of trees are proper for being employed in this way, in due assemblage with those of the evergreen and flowering kinds.

These plantations may be made either in the autumn or the early spring, according to circumstances; the former being the best where the soil is dry, but in moist retentive soils the latter should always be preferred. See CLUMP.

BENJAMIN-TREE. See LAURUS.

BERBERIS, a genus containing shrubby plants of the hardy deciduous kind. The Pipe-ridge Bush.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Berberides* of Jussieu.

The characters are: that the calyx is a six-leaved perianthium: the leaflets are ovate, with a narrow base, concave, alternately smaller, coloured, and deciduous: the corolla consists of six roundish, concave, erect-expanding petals, scarcely larger than the calyx: the nectary consists of two small, roundish, coloured bodies, fastened to the base of each petal: the stamina consist of six erect, compressed, obtuse filaments: the anthers two, fastened on each side to the top of the filaments: the pistillum is a cylindric germ, the length of the stamens: the style wanting: the stigma orbiculate, broader than the germ, surrounded with a sharp edge: the pericarpium is a cylindric berry, obtuse, umbilicated with a point, and one-celled: the seeds two, oblong, cylindric, and obtuse: the second species has three seeds.

The species most generally cultivated are: 1. *B. vulgaris*, Common Berberry. 2. *B. Cretica*, Cretan Berberry.

The first is a shrub rising to the height of eight or ten feet: the stems are upright and branched, smooth and slightly grooved, brittle, with a large white pith, and covered with a whitish or ash-coloured bark, which is yellow on the inside. Both stems and branches are armed with sharp thorns, which commonly grow by threes: the first leaves are obovate, serrate-ciliate, not jointed: the stipules are terminated on each side by a capillary tooth: stem-leaves alternate; the lowest subpinnatifid with spiny teeth: the secondary leaves are in pairs; they are oblong and serrate; and between the lowermost leaves and the thorns smaller leaves are concealed: the flowers are in pendulous racemes towards the ends of the branches, with a bracte to each pedicel: the corolla is yellow: petals frequently serrate about the edge: at the base of each are two orange-coloured dots, which are probably the nectaries: the anthers are roundish and yellow: the stigma

is greenish: the berries are at first green, but when ripe turn to a fine red colour. It is a native of most parts of the East, &c. flowering in May and ripening the fruit in September.

There are several varieties: as with red fruit, and stony seeds; with red stoneless fruit; with white fruit; and with black fruit.

The second species never rises higher than three or four feet in this climate. It sends out many stalks from the root, which are strongly armed with spines at every joint: the leaves are produced without order, and are shaped like those of the Narrow-leaved Box-tree: the flowers come out from between the leaves, each upon a slender peduncle, but these are not succeeded by fruit here. It is a native of Crete, flowering in April and May.

Culture.—The best method of propagating these shrubs is by layers, which should be laid down in the autumn, as soon as the leaves begin to drop off; the young annual shoots being made use of for the purpose. They should be left till the following autumn, when they may be taken off and planted out in the situations where they are to remain. They may also be increased by suckers, which rise annually from their roots, but the plants produced in this way are more liable afterwards to send up such suckers.

Cuttings of the young shoots will likewise often strike root and form good plants, when planted out in the spring, and properly supplied with water. These may be set out in the following spring where they are to grow.

They are also capable of being raised by sowing the seed in beds of common earth in the autumn; and when the plants have attained one or two years growth, being removed into the nursery, and planted out in rows a foot apart, and eight or ten inches from plant to plant. They should be kept perfectly clean from weeds.

When plants of this sort are intended to fruit, they should be planted singly in an open situation, and the suckers that may be thrown up carefully removed annually in the autumn, as well as all such gross shoots as may be useless pruned out. By this means the fruit will be rendered finer and more plentiful than under other circumstances.

In the second species, the layers, after being taken off, should be planted out in pots, and protected in the winter in frames, till they have attained a sufficiently hardy growth to be set out in warm situations in the open ground.

The principal culture which these shrubs require afterwards, is that of keeping their straggling shoots cut in annually.

These shrubs may be planted out towards the

back parts of large borders or clumps in pleasure-grounds, in mixture with other plants of the deciduous kind, as the fruit has a fine effect in the latter end of summer, and in the autumn. It also constitutes an excellent pickle, and an elegant garnish.

They are likewise sometimes planted so as to form a sort of hedge.

The latter species is more rare and curious than the former.

BETA, a genus comprising different plants of the hardy esculent biennial kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Holoraceae*.

The characters are: the calyx is a five-leaved, concave, permanent perianthium; the divisions ovate-oblong and obtuse; there is no corolla: the stamina consist of five subulate filaments, opposite to the leaves of the calyx, and of the same length with them: the anthers are roundish: the pistillum is a germ in a manner below the receptacle: the styles are two, very short and erect: the stigmas are acute: the pericarpium is a capsule within the bottom of the calyx, one-celled and deciduous: the seed single, kidney-formed, compressed and involved in the calyx.

The species principally cultivated in the garden are: 1. *B. vulgaris*, Red Garden Beet. 2. *B. cicla*, White Garden Beet.

The first has large thick succulent leaves, which are for the most part of a dark red or purple colour: the roots are large, and of a deep red; on which circumstances their goodness depends; for, the larger they grow the more tender they will be, and the deeper their colour the more they are esteemed. It is a native of the southern parts of Europe.

There are varieties of this which principally differ in the size and colour of their leaves; as with long dark red root; with turnip root; with short, large, dark red root; and with red root and green leaves.

In the second sort the root seldom grows larger than a man's thumb: the stalks rise erect, and have oblong spear-shaped leaves growing close to the stalk: the spikes of flowers are axillary, long, and have narrow leaves placed between the flowers: the lower leaves are thick and succulent, and their foot-stalks broad: it is chiefly cultivated for these; the leaves being boiled as spinach, or put into soups, and the stalks and midrib of the leaf stewed and eaten as asparagus.

There are three varieties of this: the White-leaved, the Green-leaved, and the Swiss or Chard Beet. The last is probably the large va-

riety lately cultivated under the title of *Racine de Disette*, Root of Scarcity or Mangel Wurzel.

Culture.—All the different species and varieties of these plants are raised by sowing the seeds in the early spring months, as from the latter end of February to the middle of April, for summer crops, but the earlier the better, if the season will admit; and for successional crops, especially in the white kind, some seed may be put in occasionally in the summer months, till the beginning of August.

The most proper soils for plants of the red beet kind, are those of the more light deep rich sort, which incline a little to a sandy nature, such as are adapted to the growth of the carrot. In preparing the land, it should always be well dug over to the depth of twelve or sixteen inches, a little well-rotted stable dung being intimately blended with the mould at the time, if manure has not been applied for the preceding crop, which is by much the best practice. The ground should then be divided into beds of four or six feet in breadth, and the surface raked even for the reception of the seed, which may be put in either by sowing it thinly over the surface, and covering it by the rake, or in small shallow drills, made at the distance of six or eight inches from each other; but for the large-leaved white sorts, considerably more, as from twelve to eighteen inches or two feet, according to circumstances. But for some of these latter kinds the ground need not be trenched over to so great a depth as for the former, though it should always be stirred when the root is the principal object, as is the case in the red sort, and occasionally in some others. Deep digging is absolutely necessary, as without it the tap root is apt to become short, and send off lateral fibres.

It is sometimes the practice with market gardeners, in order to save room, to sow these crops with those of onions and other kinds that are to be drawn out at an early period; but this should always, if possible, be avoided, as plants of different sorts seldom succeed well together, or answer the purpose of the cultivator.

In whichever method the sowing is performed, great care should be taken when the plants rise, which is mostly in the course of a month or six weeks, and have formed leaves an inch or two in breadth, to keep them perfectly clean, and thinned out to sufficient distances by repeated hoeing according to the kinds. By thus stirring the earth about the roots of the plants, and keeping them free from weeds, their growth is greatly promoted as well in their roots as the leaves.

The first sort is cultivated for the use of its large red esculent root, which in the common

kind often attains considerable length and thickness, and in some of the other varieties a still greater thickness, but less length. They become in a state of perfection and fit for culinary uses about September, or the following month; at which time some of them should be taken up, and after having the tops trimmed off, without injuring the crowns of the roots, be packed up under cover in dry sand or earth, to preserve them for the winter and early spring seasons. When the soil is dry, they are however frequently let remain in the ground to be drawn up as wanted. The largest and deepest red sorts are held in the most estimation, as being the most adapted to the purposes for which they are employed, whether for boiling and slicing, to be eaten alone or scraped, sliced in sallads, as a pickle, or for garnishing different sorts of dishes.

The common sort is chiefly cultivated as a principal crop, the varieties being mostly sown only in small portions.

The latter species and varieties are in a great measure cultivated for the use of their large succulent leaves, which are employed in soups, and boiled as spinach. In the large variety the stems and ribs of the large leaves are often made use of, after being stripped of the leafy part and the external skin, in soups and for stewing, to be eaten as asparagus.

They usually become in perfection for these purposes about the latter end of June, or in the following month, and may be continued nearly the year round by always carefully gathering the large outward leaves, the others thereby coming forward in succession, as well as further supplies produced from the roots.

The large Chard or Swiss variety is mostly cultivated in the field as a cattle-food; but may be grown in the garden, either for its leaves or the large roots: but with the latter view the leaves should not be pulled off while the plants are growing.

In all the varieties of these species, crops must be raised annually in the spring; as, though they may be continued two years by cutting down the seed-stems of the year-old plants as they rise in the second spring, the leaves are far inferior in size and fleshy substance.

For the purpose of procuring seed of the several species and varieties, some of the best and most perfect plants of each sort should be marked, and left in the second spring to stand and run up for seed; being supported with sticks during the summer, and gathered when perfectly ripe and dry, in the beginning of the autumn, as in September.

BETULA, a genus comprehending different

hardy deciduous trees, of the forest kind. The Birch and Alder.

It belongs to the class and order *Monocotyledonae*, and ranks in the natural order of *Amentaceae*.

The characters are: that the male flowers are in a cylindric ament: the calyx is a loose, cylindric ament, imbricate on every side, consisting of three-flowered scales, in each of which are two very minute scales, placed at the sides. Three equal floscules are fixed to the disk of each scale of the calyx: the perianthium in each one-leaved, small, entire, three- or four-parted: the divisions ovate and obtuse: there is no corolla: the stamina consist of four, or three or two filaments very small: the anthers are twin: the female flowers in an ament of the same plant: the calyx is a cylindric or roundish, imbricate ament, with two-flowered scales: there is no corolla: the pistillum is an ovate compressed germ, proper, very small, and two-seeded: the styles two and setaceous: the stigmas simple: there is no pericarpium: the ament under each scale cherishing the seeds of two florets: the seeds are solitary and ovate.

The species chiefly cultivated in nursery gardens are; 1. *B. alba*, White or Common Birch Tree. 2. *B. nigra*, Black Virginian Birch Tree. 3. *B. lenta*, Canada Birch Tree. 4. *B. Alnus*, The Alder Tree. 5. *B. incana*, Hoary Alder Tree.

The first is easily known by the silvery colour of its bark, or rather the outer thin covering to the bark; by the smallness of the leaves in comparison with other timber trees; and the lightness and airiness of its whole appearance. It is of a middling or rather inferior size to other forest trees. The branches are alternate, subdivided, very pliant and flexible, covered with a reddish brown or russet, smooth bark, generally dotted with white. The leaves are alternate, bright green, smooth, shining beneath, with the veins crossing like the meshes of a net: the petioles are half an inch or more in length, smooth, grooved above; and at the base are ovate green glands. The male aments or catkins appear in autumn, keep on during the winter, and unfold their flowers when the females appear in spring; they are situated at the ends of the twigs, commonly two together, sessile, cylindric, blunt, long, narrow, and pendulous: the scales separating the flowers are roundish, acuminate, yellowish brown, and smooth: the female aments appear in spring at the ends of the shorter branches; they are solitary, at first upright, but afterwards nodding a little, cylindric or rather ovate, blunt, on pedicels near a quarter of an inch in length, shorter and thicker than the male aments: the scales have

from two to four flowers in each, they are lanceolate, blunt, green, and smooth; the germs two, sometimes more, compressed: the styles and stigmas are reddish. It is a native of most parts of Europe.

The chief variety of this is the Pendulous or Weeping Birch.

The second species has the larger serratures of the leaves deeper and more remote, and besides these very small, fine, crowded ones; the base from an obtuse angle is quite entire. The twigs are pubescent, and the petioles villose. The branches are spotted, and more sparingly set on the tree than in the common sort. The leaves are broader, and grow on longer petioles. It arrives at a much greater size, and is equally hardy with the White Birch.

There are several varieties of it: as the Broad-leaved Virginian Birch; the Poplar-leaved Virginian Birch; the Paper Birch; and the Brown Birch.

In the third species the leaves are smooth, very finely and sharply serrate. The female catkins are ovate, sessile, with acuminate entire scales. It grows to a great height.

There are several varieties, as the Dusky, White, Paper, and Poplar-leaved Canada Birch.

The fourth, though it appears as a shrub, frequently will however grow to a considerable tree. The bark is blackish, and in old trees full of clefts. The wood is red and brittle. The leaves are of a dark green colour, and a roundish figure, resembling those of the hazel, crenate, smooth, and in the common sort viscid to the touch: the nerves on the under side have spongy balls at the angles of their ramifications, as in the leaves of the lime-tree: the petioles are grooved above, and near an inch long; at the base of these are lanceolate, blunt stipules. The male catkins are cylindric, appear in the autumn, and continue to the spring. The females are of a short conical form, like a small fir cone. It is a native of most parts of Europe.

There are several varieties: as the Long-leaved American, the White, the Dwarf, and the Cut-leaved Alder.

The fifth species is very distinct from the above, both in the structure of its parts, and its uses. It never attains the size of that, and is commonly shrubby: the trunk is scarcely thicker than the human arm: the wood is white, and of a closer texture: the branches and even twigs are testaceous, hoary, diverging at half a right angle: the leaves are not round but ovate, drawn out at the end, unequally serrate with very sharp toothlets, sometimes doubly-serrate with very obscure incisions, very smooth, and somewhat glutinous even beneath, except at

the divisions of the nerves, where they have a close thick pubescence. The male catkins are sessile at the ends of the branches, usually by threes; they are two inches long, the thickness of a swan's quill; and the scales ferruginous: the female catkins, one on each side, having two or three bundles between the shining-brown testaceous scales, coming out with a leaf or two, alternate on the peduncles; when in flower they are of a brownish green colour, and of an oblong cylindric form: when ripe they are smaller than those of the common Alder, not divaricate, and in other respects different. It is a native of different parts of Switzerland.

There are many varieties: as the Cut-leaved, the Dwarf Alpine, the Long-leaved, and the Rose-flowered Hoary Alder.

Culture.—The soils most suited to the culture of the Birch are those of the light black loamy kind, on a dry sandy or gravelly substratum. In those of the more moist and retentive descriptions, it grows with rapidity, but soon decays, and the wood is not so valuable. It grows more slowly on those of the light sandy or gravelly kinds, and where the situation is exposed; but the timber is better.

All the species are capable of being raised by sowing the seeds; collected when the scales inclosing them begin to open in the autumn, on narrow beds of light earth, either at the above period or in the early spring months, covering them in a very slight manner. When the young plants appear they should be kept clean from weeds, and after they have attained sufficient growth be planted out in rows in the nursery-ground, at the distance of six, eight, or twelve inches from each other, having spaces of from eighteen inches to two feet between them. In these situations they may remain till they have attained a growth sufficient to be planted out in the pleasure-ground, as five, six, or eight feet in height. In the American sorts the seeds are supplied by the ships from thence.

They may also be increased by layers made from the young shoots of two-years growth. In order to effect this, a few trees of the best sorts wanted should be headed down in the autumn to the ground, to form shoots, which, by sending out lateral branches in a plentiful manner in the spring, fully answer the purpose. These are plashed and laid down into the mould, with their smaller shoots, when of sufficient growth; all of which soon strike root, and become fit to be taken off and planted out in the nursery-ground, in rows, at similar distances to the above, when they have had a twelvemonth's growth. These stools continue to afford supplies of fresh shoots, for being laid down, for several years.

While in the nursery the plants should be kept clean from weeds, by being frequently hoed among, and having the earth well stirred and loosened between them. During this period all such plants as are crooked and not handsome in their growth, or which are of slow and imperfect growth, should be cut over close to the surface of the ground, in order that they may shoot up again in better forms.

This is the best method of increasing all the varieties of both the common and other species, as they are liable to degenerate when raised from seeds.

With the common sort it is recommended by some, as the best and most ready method of providing this sort of plants, where it can be done, to collect them from woods or other places where they have risen naturally from seeds. They mostly succeed well when removed to better soils, and more open situations.

The fourth species, besides being raised in the two first of the above methods, is capable of being increased by cuttings of different sizes, when planted in such situations as are inclined to be moist. When these have had two or three years growth they may be removed into the places where they are to remain. They likewise grow well from large cuttings usually termed truncheons, when planted out in such situations as the above. These should be formed to the length of from two to three feet in length, being set one-third into the ground, holes being first made for their reception, and the bark wholly preserved upon the parts which are thus introduced. Upon this being perfectly attended to, much of the success of the planter depends.

The last species naturally affects such soils as are of the poor sandy or gravelly kinds: it may of course be employed where other trees cannot be introduced. It is capable of being reared in the same methods as the other species.

All the different species and varieties of these trees, when introduced in proper mixture with others of the deciduous kind, in large plantations, clumps, wilderness quarters, and belts of planting on the sides or other parts of pleasure-grounds, produce a good effect, affording much diversity by the great variety in their foliage and colour. The Weeping Birch and some of the other sorts have likewise an agreeable appearance, when planted singly on extensive lawns or open spaces. The foliage in the Alder, though full and pleasing, is but seldom observed in the plantations or other parts of ornamented grounds. It would seem, however, to deserve a place in such situations in all its different varieties.

From the juice of the common Birch, col-

ected by boring the trees in the early spring months, as about March or April, and introducing pipes, formed of elder, into the holes to conduct the liquor into bottles placed for the purpose of receiving it, a good and pleasant wine is prepared, by letting it afterwards undergo the process of fermentation.

The twigs and small branches of these trees may be occasionally cut over for the purpose of making birch brooms.

BIENNIAL PLANTS, such as are only of two years duration. These are of the esculent as well as the flower kind.

There are various plants of this tribe, which being raised one year from seed, generally attain perfection, either the same or in about the period of a twelvemonth afterwards, and which in the following spring or summer shoot up stems, flower, and perfect their seeds; after which most of the sorts either soon wholly perish; or, when any particular sort survives another year, the plants assume a dwindling and straggling growth, and gradually decline. *Biennials* are consequently always in their prime the first or second summer after they rise: they must in general, of course, be raised annually from seed, for successional supplies in the different kinds.

The most common of the esculent kind are the *Cabbage, Savoy, Carrot, Parsnep, Beet, Onion, Leek*, and some others. And of the flowery tribe, the *Canterbury-bell, French Honeysuckle, Wall-flower, Stock, July-flower, Sweet William, China Pink, Matted Pink, Carnation, Scabious, Tree Mallow, Vervain Mallow, Tree Primrose, Honesty* or *Moon-wort*, and some others, all which rise the spring after being sown, and in the following spring shoot up into stem, flower, and perfect their seeds in autumn, after which most of them dwindle and decline, though the *Wall-flowers, Stocks, Sweet Williams, and Carnations*, sometimes survive, and flower the following year; but the plants become weak and straggling, and the flowers small and badly coloured. On these accounts it is necessary to raise a fresh supply annually, from seeds of all the different sorts. The *Wall-flowers, Carnations, and Pinks*, may however be continued by planting slips and layers in the summer, in a perennial state, in the utmost perfection.

BIGNONIA, a genus comprehending several plants of the shrubby and tree exotic kinds. The *Trumpet Flower, or Scarlet Jasmine*.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved, erect, cup-form, five-cleft perianthium:

the corolla monopetalous, campanulate: tube very small, the length of the calyx: throat very long, ventricose beneath, oblong-campanulate: border five-parted, the two upper divisions reflex, lower patulous: the stamina consist of four subulate filaments, shorter than the corolla; two longer than the other two: the anthers reflex, oblong, as it were double: the pistillum is an oblong germ, the style filiform, having the situation and form of the stamens: the stigma is capitate: the pericarpium is a two-celled, two-valved silique: partition membranaceous, parallel and thickened at the sutures: the seeds are very many, imbricate, compressed, and membrane-winged on both sides.

The species chiefly cultivated for ornamental purposes are: 1. *B. Catalpa*, Catalpa and Tree Bignonia. 2. *B. sempervirens*, Evergreen Carolina Bignonia, or Yellow Jasmine. 3. *B. unguis*, Cut-claw Bignonia. 4. *B. radicans*, Rooting Ash-leaved Scarlet Bignonia.

The first is a deciduous tree, rising with an upright stem, covered with a smooth brown bark, to the height of thirty or forty feet in its native situation, but not nearly so high in this climate: it sends out many strong lateral branches, having very large, heart-shaped, or ovate, leaves on them, placed opposite at every joint. The flowers are produced in large branching panicles towards the end of the branches; they are of a dirty white colour, with a few purple spots, and faint stripes of yellow on their inside: the tube of the corolla is much shorter, and the upper part more spreading than in the fourth sort: the segments also are deeper cut, and waved on their edges. The flowers are succeeded by long taper pods in its native situation; but these have not as yet been produced in this climate. It is a native of South Carolina, and flowers in August.

The second species rises with slender stalks, which twist themselves round the neighbouring plants, and mount to a considerable height: the leaves come out single and opposite to each other at every joint: they remain green through the year. The flowers come out from the wings of the leaves at every joint, sometimes but two, at other times four at each joint; these stand erect, are trumpet-shaped, yellow, and have a very sweet scent; and, in the countries where they grow naturally, are succeeded by short taper pods filled with small winged seeds. It is a native of South Carolina.

The third rises with slender stems which require support. The leaves are small, ovate, entire, and placed opposite at every joint; at the same places come out the tendrils, by which the plants

fasten themselves to whatever grows near them: the flowers are axillary, and shaped like those of the Foxglove. They are not succeeded by pods in this climate. It is a native of the West-Indies.

The fourth species has rough stems, which send out many trailing branches, putting out roots at their joints, and thereby fastening themselves to the trees in their natural places of growth, and climbing to a great height: when it is planted against walls, it strikes into the mortar of the joints so strongly as to support the branches, and will rise to the height of forty or fifty feet. The leaves are opposite at every joint, composed of four pairs of leaflets, terminated by an odd one; they are serrate, and end in a long sharp point. The flowers are produced at the ends of the shoots of the same year, in large bunches; they have long swelling tubes, shaped somewhat like a trumpet, whence the plant has the appellation of Trumpet Flower. The corolla is of an orange colour, and opens at the beginning of August. It is a native of Carolina.

There is a variety of this with small flowers.

Several other species of this genus are equally deserving of cultivation.

Culture.—These plants are capable of being raised either from seeds, layers, or cuttings of the stronger shoots, according to the species.

In the first, the best methods are those of sowing the seeds, obtained from abroad, in pots of light fresh earth, in the early spring season, plunging them immediately in a moderate hot-bed of tan or dung: when the young plants appear, they should be placed in warm sheltered exposures till the autumn, when they require the protection of frames and glasses, or of a good green-house, free air being admitted when the weather will permit. After the plants have attained sufficient growth in these situations, they may be removed from the pots, planted out in warm situations where they are to remain, or in the nursery, protection being given them in the winter season when it proves severe.

Some however prefer raising plants of this sort by setting the cuttings of the young shoots in the early spring, in pots of the same earth, plunging them in moderate hot-beds till they have stricken full root, water and shade being occasionally given them, gradually as the summer advances enuring them to the full air, in order to harden them. On the approach of autumn, they should be taken under shelter of some sort when the weather is severe. In the spring following they may, if necessary, be

planted out where they are to stand, or be put in the nursery ground.

These plants succeed best in such soils as are rich, and rather inclined to moisture.

All the other species may likewise be raised from seeds, by being managed in the same manner as the preceding one; but a more ready method is by layers, made from the young shoots in the autumn or spring seasons; which may be taken off and planted out, either where they are to remain, or in the nursery-ground, after they have had a twelvemonth's growth. They are also capable of being increased by cuttings of the more strong shoots, planted out and managed in the same way as in the first sort.

In all the kinds, the plants raised from seeds are much longer before they produce flowers, than when they are propagated by layers or cuttings of the flowering plants.

The chief culture, after the plants are fully established, is that of cutting out all the small weak shoots of the preceding year, in the winter season, and shortening the stronger ones to the length of about two feet, in order to induce flowering shoots to be sent out for the ensuing summer. These plants are all of long duration, when carefully managed.

The first species, though late in putting out its leaves and flowers, is a highly ornamental shrubby tree, that may be introduced with propriety and great effect in the back but more conspicuous parts of large borders, or the middle of large clumps and other planted parts of shrubberies and grounds. When in full foliage it has a fine appearance, affording an agreeable diversity in such situations.

It is likewise well suited for planting out singly on the more spacious lawns or other open parts, where the situations are not too much exposed, as when permitted to take its natural growth it produces a good effect.

The second species is more tender, requiring the protection of mats or other coverings in winter, in the time of frosts, and the application of tan or litter about the roots. It succeeds best, and has the finest appearance, when planted against a warm wall, where it has room to climb and spread.

The third and fourth species are much more hardy, though they should have some protection when frosts occur in the winter. They are very ornamental when planted against high walls or buildings, especially the latter, as it will fix on the crevices, and extend itself over a vast surface. If trained up against high trees, it also produces a fine appearance when in flower.

BIXA, a genus containing a plant of the

evergreen shrubby kind. The Dyeing *Mitella*, Spanish *Anotto*, or French *Roucon*.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Columniferae*.

The characters are : that the calyx is a five-toothed, very small, obtuse, flat, permanent perianthium : the corolla is double : outer, with petals five, oblong, equal, large, more rude ; inner, with five petals like the outer, but thinner : the stamina have numerous filaments, setaceous, shorter by half than the corolla : the anthers are erect : the pistillum is an ovate germ : the style is filiform, the length of the stamens : the stigma parallelly bifid, and compressed : the pericarpium is an ovate-cordate, compressed capsule, fenced with bristles, bivalve, gaping at the angles, one-celled, with an inner bivalve membrane : the seeds are numerous, turbinate, with a truncated navel, and berried : the receptacle is linear, longitudinal, and fastened to the middle of the valves.

There is only one species, *B. Orellana*, American Bixa.

It is a shrub which in its native situation rises with an upright stem to the height of eight or ten feet, sending out many branches at the top, forming a regular head. These are garnished with heart-shaped leaves ending in a point, which have long foot-stalks, and come out without any order. The flowers are produced in loose panicles at the end of the branches, of a pale peach colour, having large petals. They are succeeded by a pulpy red fruit. This is a native of the East and West Indies. It is from the red pulp, covering the seeds of the fruit of this shrub, that the *Arnotto* employed as a colouring ingredient is prepared.

Culture.—The propagation of this shrub is effected in this climate by sowing the seeds, which are brought from the West-Indies or America, in small pots filled with light rich mould in the spring, being then plunged into a gentle hot-bed of tan ; and when the plants appear, and are of sufficient growth, they should be carefully transplanted into separate pots, and again placed on heat, being shaded when necessary. During the summer they should be often refreshed with a very small supply of water, but in the winter very little, as their roots are apt to rot. A good degree of warmth is requisite at this season, in the tan-bed, while the plants are in their more early growth, to keep them from decaying in the tops. They require to be constantly kept in the tan-bed of the bark-stove, as they do not succeed so well in the dry stove. They are cultivated for the purpose of variety.

BLIGHT, a vegetable disease frequently at-

tacking fruit- and other trees, and plants, in the spring and summer months, and sometimes destroying their leaves, blossoms, branches, and fruit.

It has been supposed to proceed from very different causes, as the prevalence of easterly winds injuring the tender leaves and flowers, and causing them to wither and decay, and, by condensing the fluid that exudes from them, forming a food as well as nidus for the support and harbouring of various small insects, by which they not only multiply rapidly, but greatly increase the distemper that may have been commenced ; the effects of sharp hoar frosts succeeding hot sunny days in the vernal season, when the irritability of the parts has been greatly lessened by the action of the heat ; sudden severe morning frosts occurring at the time of flowering, or that of the fruit setting, or while it is in its very early growth ; the suddenly exposing the trees or plants to the full action of light and air, after they have been closely covered for some time ; the deficiency of the soil for the proper nutrition and support of the trees and plants ; the vitiated state of the circulating fluids ; and a defect of the vegetative process of the plants. The nature of this vegetable malady is not however yet perfectly investigated, or so well understood as to afford any very certain method of removing it.

In the first case, it has been proposed as the most effectual management, to have the trees or plants well washed with pure water in the early part of the day, when the weather is not frosty, in order that they may get perfectly dry before night ; or what Mr. Forsyth thinks much preferable is urine and soap-suds, which should be applied as early as possible after the disease shows itself ; and where the young and more tender shoots seem much affected, a fluid formed by putting caustic, lime, tobacco, sulphur, and elderbuds, into ten gallons of boiling water, in the proportions of one peck of the first, two pounds of the sulphur, and one of each of the other ingredients, cold water being afterwards poured on so as to make a hog-shead. This liquor is to be made use of by dipping a woollen cloth in it, and washing the branches well with it.

In the second instance, or when the disease is produced by the effects of frost, the best mean which has yet been employed is that of covering the trees or plants by an open sort of netting, which is folded once or more as there may be occasion, as in this way air is freely admitted, and at the same time the danger of the frost avoided, without injury being done by close covering, as is the case when mats or other similar articles are had recourse to for the pur-

pose. Much of the good effect of this will, however, depend upon the correctness of the manner in which such protections are applied, and their not being so long continued at a time as to render the admission of the free air and light injurious to them. The trouble attending this practice may be in a great measure prevented by having such nettings or other coverings so contrived as to roll up and let down by cords and pulleys.

Where plants or trees have been covered for some time in a close manner, great care should be taken to gradually expose them to the full influence of light and air, as by such means much injury may often be prevented in the fruit and tender branches.

If distempers of this sort are caused in trees or plants from the improper quality of the soil, their not being suited to its peculiar nature, or its not being in a proper condition for their growth and support, which is shown by their great weakness and debility, and their imperfect growth in comparison of others that are situated exactly under the same circumstances; the remedy must be varied according to the particular cause from which it may seem to originate. Where the soil is improper, it should be dug out to some extent round the trees or other plants, and better fresh earth be supplied. If it be not suited to the nature of the trees, the best plan is to have them taken up at once, and removed into other more favourable situations, as it is not possible for every sort of tree or plant to succeed well in the same sort of soil.

When the malady depends on some morbid condition of the juices of the plants, or on the vegetative process being interrupted or imperfectly carried on, a speedy removal into another situation will be the only chance of effecting their safety; new mould being supplied, and their places filled by others.

Imperfect culture sometimes proves the cause of the Blight, as, when the pruning and training have been performed in an injudicious manner, or at an improper season, the trees are apt to become weak, and readily affected by the disease. The principal remedy in these cases is that of greater attention in these important operations, performing them in such a way as to leave the bearing branches as well as the trees in the most vigorous state of growth.

There is a state of plants and trees frequently occurring late in the spring, as in May, which is termed the *fire-blast*, often suddenly destroying not only the fruit and leaves of the plants, but the branches, and sometimes the whole trees. It mostly takes place in situations where they are planted close. It has been ascribed to vari-

ous causes; as certain transparent flying vapours acting so as to converge the rays of the sun in the manner of a burning lens; thus scorching the parts of the plants they happen to fall upon, in proportion to their convergency, and the reflection of such rays from hollow clouds producing their effects in a similar manner.

The only means of obviating these effects are those of planting fruit-trees in less close situations, and more open exposures, that they may have a more free admission and circulation of air to dispel such collecting vapours before they produce such effects.

It seems not improbable but that effects of the blight kind may sometimes take place in different sorts of plants and crops, from the prevalence of strong winds blowing from the sea, by their being saturated with saline matters, which they convey and deposit upon them at considerable distances, and which, by their decomposition on the plants, induce such affections.

BLITUM, a genus comprising different plants of the annual herbaceous ornamental kind. The Blite, or Strawberry Spinach.

It belongs to the class and order *Monandria Digynia*, and ranks in the natural order of *Holoraceae*.

The characters are: that the calyx is a three-parted, spreading, permanent perianthium, the divisions ovate, equal, two more gaping than the other: there is no corolla: the stamina a setaceous filament, longer than the calyx, within the middle division, and erect: the anther is twin: the pistillum is an ovate, acuminate germ: the styles are two, erect, and gaping, the length of the stamen: the stigmas are simple: the pericarpium is a very thin capsule, (rather the crust of the seed) ovate, a little compressed, contained within the calyx now become a berry: the seed single, globular and compressed, the size of the capsule.

The species mostly cultivated for ornament are: 1. *B. capitatum*, Berry-headed Strawberry Blite; 2. *B. virgatum*, Slender-branched Strawberry Blite; 3. *B. Tartaricum*, Tartarian Strawberry Blite.

The first is an annual plant, with leaves somewhat like those of Spinach. The stalk rises about two feet and a half high, when cultivated in gardens. The leaves on the lower part of it are of the same shape with the root-leaves, only smaller. The upper part of it has flowers coming out in small heads at every joint, and is terminated by a small cluster of the same. After the flowers are past, these little heads swell to the size of wood strawberries, and when ripe have the same appearance; being very succulent, and full of a purple juice, which

stains the hands, and was formerly used for culinary purposes as a colouring ingredient.

There are varieties, with white and red leaves.

The second species seldom grows more than one foot high, with smaller leaves than the first, but of the same shape. The flowers are produced from the axils, almost the whole length of the stalk: they are small, and collected into little heads, shaped like those of the first, but smaller, and not so deeply coloured. It is a native of the South of France.

There are varieties, with striped leaves, and with white flowers.

The third rises near three feet high: the leaves are triangular, ending in very acute points, as also the indentures on the edges of the leaves. The flowers are axillary in small heads. The fruit is of the same shape and colour as those of the first, but smaller. This differs from that in the shape and indentures of the leaves; and in having leaves placed between the fruits the whole length of the stalk, which is not terminated by heads as in the first, but has leaves above the heads. Martyn supposes this is probably no more than a variety of the second sort.

Culture.—These plants are raised by sowing the seeds annually, in the early spring months, in patches of three or four together, in the borders or clumps where they are to remain, the mould in the places being broken down and rendered rather fine before they are put in. They may also be sown on beds of light earth, and when they rise to a sufficient growth be transplanted to the places where they are to grow, which should be done before the flowering stems rise. The first is the best method. A few may also be raised in pots for particular purposes, which must be kept occasionally watered in dry seasons, and supported by sticks.

When planted out in the natural ground, they must be kept clear from weeds, and properly thinned, and have support when necessary to prevent their being pressed down by the weight of the fruit. They often rise freely from self-sown seeds.

They are chiefly cultivated for the ornament which the fruit affords in the latter end of summer, which is as large as that of the common strawberry, and of a red colour. They have a good effect when set out in assemblage with other potted plants in conspicuous situations about the house.

BLOOD-FLOWER. See *HÆMANTHUS*.

BOCCONIA, a genus containing a shrubby plant of the exotic kind, for the stove. Tree Celandine or Parrot-weed.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Rhœadææ*.

The characters are: that the calyx is a two-leaved, ovate, obtuse, concave, caducous perianth: there is no corolla: the stamina consist of twelve filaments, very short: the anthers are linear, very large, the length of the calyx: the pistillum is a roundish germ, contracted both ways, large and pedicelled: the style one, bifid: the stigmas are simple and reflex: the pericarpium is subovate, attenuated to each end, compressed, one-celled, and two-valved: the valves are coriaceous, gaping from the base, the annular suture continuing; crowned with the style: the seed one, globular, the base involved in pulp, fixed to the bottom of the capsule.

There is only one species: *B. frutescens*, Shrubby Bocconia, or Tree Celandine.

It is a shrub which rises to the height of ten or twelve feet, with a straight trunk, as large as a man's arm, covered with a white smooth bark, and branched towards the top: the trunk is hollow, filled with a pith like the elder, abounding in a thick yellow juice: the branches are brittle, unequal, marked with scars from the fallen leaves: the leaves are from six or seven inches to a foot in length, oblong, sinuate-laciniate, subserrate, smooth, and ash-coloured-tomentose beneath: the petioles are roundish, and pubescent: the racemes terminating, panicled, a foot long, diffused and nodding: the peduncles are one-flowered: the bracts under the flowers are small and lanceolate: the filaments are ten, seldom more, longer than the leaflets of the calyx, hanging down and loose: the anthers are longer than the filaments: the germ is ovate, compressed, and glaucous. It is a native of Mexico, &c.

The acrid juice is sometimes used to take off tetter and warts.

Culture.—This plant is increased by sowing the seeds in pots filled with light earth early in the spring season, and immediately plunging them into hot-beds of tan, which have a moderate degree of heat; water being occasionally given in small proportions to promote the vegetation of the seeds. When the plants have acquired a sufficient growth, they may be carefully removed into separate pots of light sandy mould, and again placed in the hot-bed, shading them when necessary till they become well rooted, water being sparingly employed till the plants have attained a ligneous growth, when it may be used with more freedom, especially in dry seasons, and large portions of air be admitted. When these pots become

filled by their roots, they must be again removed into larger ones, and replaced in the bark-stove, plentiful supplies of fresh air being admitted when the weather is suitable. With this culture the plants become strong, vigorous, and healthy in their growth.

The beauty of this shrubby plant should procure it a place wherever singularity and a diversity of effect are desired.

BOMBAX,—a genus comprehending trees of the exotic kinds. The Silk Cotton Tree.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved, tubular-campanulate, permanent perianthium: the mouth three- or five-cleft, obtuse, and erect: the corolla is five-parted, and spreading: the segments oblong, and concave: the stamina consist of five or many subulate filaments, the length of the corolla, connate at the base: the anthers are oblong, bent in, and incumbent: the pistillum is a roundish germ: the style is filiform, the length of the stamens: the stigma capitate, and five-toothed: the pericarpium is a large, turbinate-oblong, five-celled, five-valved capsule: valves woody: the seeds are very many, round and woolly: the receptaculum is columnar, and five-cornered, forming the partitions.

The species chiefly cultivated for variety in the stove are: 1. *B. pentandrum*, Pentandrous Smooth Bombax; 2. *B. heptaphyllum*, Heptaphyllous Smooth Bombax; 3. *B. Ceiba*, Cuba or Thorny Bombax.

The first has smooth stems, which in the young plants are of a bright green, but after a few years are covered with a gray or ash-coloured bark, which turns to a brown as the trees grow older: they seldom put out any side branches till they arrive at a considerable height, unless their leading shoot be broken or injured. The branches towards their top have leaves composed of five, seven or nine smooth, lanceolate leaflets, joined to one centre at their base, where they adhere to the long footstalk. These fall away every year, so that for some time the trees are naked; and before the new leaves come out, the flower-buds appear at the ends of the branches, and soon after the flowers expand: they are composed of five oblong purple petals, with a great number of stamens in the centre; when these fall off, they are succeeded by oval fruit larger than a swan's egg, having a thick woody cover, which, when ripe, opens in five parts, and is full of a short dark cotton, inclosing many roundish seeds as large as small peas. It is a native of the East Indies.

The second species in its natural situation grows fifty feet high before it branches, and is near eighteen feet in thickness. The bark has smooth, shining, sharp prickles, which fall off on the body, but remain on the branches: the leaves are seven-lobed, and united at the base; and the flowers are succeeded by large oval fruit containing seeds and cotton. It grows every where in Malabar.

The third sort has the trunk closely armed with short, strong spines: the branches come out near the top, and are covered with leaves, having five long spear-shaped lobes, uniting at the base; the flowers appearing at the ends of the branches, which are succeeded by large oval fruit, filled as in the preceding. This has been supposed to be the same with the first sort; but, from many years' experience, Mr. Miller affirms, that seeds sent him of the two sorts always produced different plants, and continued the same at more than twenty years growth.

Culture.—These plants may be increased by sowing the seeds, obtained from the West-Indies, in the early spring season, on a gentle hot-bed, or in pots of light fresh earth, plunging them into the tan-bed. When they have attained sufficient growth, they may be removed into separate pots, and be replaced in the hot-bed, water and shade being given when necessary. As they advance in growth they must be shifted into larger pots filled with fresh loamy earth: water should be admitted freely in the summer season, but very moderately during the winter, as the roots are apt to be destroyed by much moisture: during their whole growth air should be supplied freely when the weather will permit, to prevent their being drawn up in a weak unhealthy growth. They must be constantly retained in the hot-house or stove.

Though they attain a large growth in their native situations, they only acquire a shrubby stature when cultivated in this climate. From the singularity and contrast which their leaves afford to those of other plants, they produce a striking diversity in large houses, where they have sufficient room to grow to a full size. From their slowness in flowering in their native state, they seldom produce any here.

BONTIA, a genus comprising a plant of the evergreen exotic kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personate*.

The characters are: that the calyx is a one-leaved, five-parted perianthium: the leaflets are blunt, upright and permanent: the corolla is one-petalled and ringent: the tube long and cylindric: the border gaping: the upper lip

upright and emarginate: the lower revolute, and semitrifid, the size of the upper: the stamina consist of four subulate filaments, bending to the upper lip, the length of the corolla: two higher: the anthers are simple: the pistillum is an ovate germ: the style is simple; situation and length of the stamens: the stigma bifid, and blunt: the pericarpium is an ovate drupe, with the top oblique: the seed an oval nut, one-celled, and germinating.

There is only one species cultivated for ornament in the stove; *B. Daphnoides*, Daphne-like Barbadoes Wild Olive.

In this the leaves are thickish, rather stiff, very smooth, and green on both sides; the lower ones are very slightly toothed: the corolla is yellowish, with a line of dusky purple along the middle of the lower lip. It rises ten feet in height. The flowers come from the sides of the branches, and are succeeded by large oval fruit, which occasionally ripen here. It flowers in June.

Culture.—Plants of this sort may be easily raised from seeds, which should be sown on a moderate hot-bed early in the spring, that the plants may acquire strength before winter. When of sufficient growth, they must be planted out into a separate small pot filled with light fresh earth, and plunged into a moderate hot-bed of tanners bark, water and shade being given until they have taken root; after which they must have a large share of air in warm weather, and be often refreshed with water. In winter they should be placed in the stove, where they should have a moderate degree of warmth, and but little water. They require much air in summer, but will not succeed well if exposed abroad in cold summers; they should therefore remain in the stove among plants which require a free air. In this management they mostly produce flowers and fruit in three or four years.

They are also capable of being propagated by cuttings, which should be planted out in the summer; being put into pots filled with light rich earth, and plunged into a moderate hot-bed, water and shade being given until they have taken root; after which they must be treated as the seedling plants.

These plants, from their being evergreen, and having a pyramidal form, make a pretty variety in the stove, in assemblage with other plants of the exotic kind.

BORAGE. See **BORAGO**.

BORAGO, a genus containing herbaceous plants of the hardy annual and perennial kinds.

It belongs to the class and order *Pentandria*

Monogynia, and ranks in the natural order of *Asperifolice*.

The characters are: that the calyx is a five-parted permanent perianth: the corolla is monopetalous, rotate, the length of the calyx; the tube shorter than the calyx: border five-parted, rotate, and flat: throat crowned with five emarginate obtuse prominencies. The stamina consist of five subulate converging filaments: the anthers are oblong, fixed to the inside of the filaments in the middle, and converging: the pistillum consists of four germs: the style filiform, longer than the stamens: the stigma simple: there is no pericarpium: the calyx larger, and inflated. The seeds are four and roundish, being wrinkled, and keeled outwards at the top, globular at the base, and inserted longitudinally into a hollowed receptacle.

The species chiefly cultivated in gardens for use or ornament are: 1. *B. officinalis*, Common Annual Borage; 2. *B. orientalis*, Oriental Perennial Borage.

In the first the whole plant is rough, with white, stiff, prickly hairs; the peduncles terminating and many-flowered; the calyx divided to the very base, and also the corolla, but it falls off in one piece; the tube very short and white; the segments acute; filaments very short, white, and springing from the claws of the petal, with a sharp blue process where the anthers are inserted: these are of a blackish or dark-purple colour, and form a kind of *umbo* in the middle round the flower. The common colour of the corolla is blue, but it varies to flesh-coloured and white. It is an annual plant, and flowers from May to August. It is a native of Aleppo, but naturalized here, &c.

There are varieties, with red flowers, with white flowers, and with variegated leaves.

The second species is a perennial plant, with thick fleshy roots, spreading under the surface: the root-leaves are many, oblong, and heart-shaped, on long hairy foot-stalks: the flower-stem rises more than two feet in height, having at the joints a single, small, sessile leaf; the upper part branches out into several small foot-stalks, which are terminated by loose panicles of flowers of a pale-blue colour: the petal is turned back, so that the connected anthers and style are left naked. The seeds are smaller than those of common Borage. When the flower-stalk first appears the flowers seem collected into a close spike, some of which often spread open before the stalk is six inches high; but, as the stalks advance, they divide into many loose spikes. It is a native of Constantinople, and flowers in March.

There are other species, which may be cultivated where variety of these sorts of plants is wanted.

Culture.—These plants are easily propagated, either by the seeds, or dividing the roots according to the kinds.

In the first sort, the best mode is by sowing the seeds annually in the autumn or spring months in the places where the plants are to stand, or by letting the plants shed their seeds, keeping them from standing too closely together. When they are intended for the produce of their tender young leaves, they may be sown broadcast in small beds at different times, from the spring till autumn, in the garden, covering the seed by the rake; afterwards, when of proper growth, keeping the plants thinned out to a good distance, as six or eight inches, or more. In this way supplies of green leaves and flowers are provided in succession, for summer, autumn, and the following early spring.

The second species is increased with much facility by parting the roots, and planting them out where they are to remain, in the autumn. It may also be raised by sowing the seeds at the same season, where they are to remain, keeping the plants while young perfectly free from weeds.

The first sort, and varieties, will succeed in almost any soil or situation, being perfectly hardy; but the latter species, as the flower-stems are put forth very early in the spring, requires a dry soil, and warm aspect, to guard against the effects of frost. Such effects are much obviated by having their roots planted in dry lime or other rubbish, as well as their over luxuriant growth prevented, and the danger of frosts consequently greatly lessened. When these plants have been once planted, they continue for many years with little trouble, and are not liable to be injured by the vicissitudes of heat or cold.

The first species is employed both as a plant of utility and ornament, being valued by some for culinary purposes, as a pot-herb; and for the young leaves and flowers to be made use of in the way of sallads, as well as for being put in wine to form cool tankards. It may also be planted on borders or clumps in pleasure-grounds for variety.

The latter sort is wholly employed as a flowering ornamental plant.

BORBONIA, a genus comprising plants of the shrubby exotic kind, for the green-house.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Leguminosae*.

The characters are: that the calyx is a one-leaved, semiquinquefid, turbinate perianthium, half the length of the corolla: divisions lanceolate, acuminate, rigid, pungent, and subequal; the lowest longer than the rest: the corolla is pentapetalous, papilionaceous, and hirsute on the outside: banner reflected, and obtuse: claw the length of the calyx: wings semicordate, a little shorter than the banner: keel two-petalled, lunulate, and obtuse: the stamina have nine filaments, united into a cylinder gaping longitudinally above, rising at the ends: the anthers are small: the pistillum is a subulate germ: the style very short, and ascending: the stigma obtuse and emarginate: the pericarpium is a roundish legume, acuminate, one-celled, mucronate with a spine: the seed kidney-form.

The species mostly cultivated for ornament and variety are: 1. *B. lanceolata*, Spear-leaved Borbonia; 2. *B. cordata*, Heart-leaved Borbonia; 3. *B. crenata*, Notch-leaved Borbonia.

The first has a stem a foot high, smooth, round, and ash-coloured: divided into a few branches, which are red whilst young: the leaves are stem-clasping, long, narrow, ending in a sharp point. The flowers come out from between the leaves at the ends of the branches in small clusters: they are yellow, and shaped like those of broom. It flowers in August and September.

In the second species the leaves are broader than in the first: the stalks are slender, and covered with white bark: the leaves are stem-clasping, and terminated by sharp points, like those of butcher's broom. The flowers are produced in small clusters at the ends of the branches, and are of the same shape and colour as those of the above sort, but larger. The calyx is five-cleft, nearly regular, hirsute, with spiny segments, and the whole corolla tomentose on the outside.

The third has the leaves cordate stem-clasping, net-veined, and pointed: the flowers are in racemes.

All these species are natives of the Cape.

Culture.—These plants may be increased either by sowing the seeds obtained from abroad in pots of light loamy earth as soon as procured, and when of proper growth in the autumn placed in an old tan hot-bed under frames to be protected during the winter from frost and too much moisture; and in the spring sowing, plunged in a moderate hot-bed in order to promote the vegetation of the seeds, and when the plants have attained a sufficient growth, removed into separate small pots, being replunged into the hot-bed, proper shade and water being given; or by laying down

the young root-shoots in the beginning of September, in which operation the joint to be laid in the earth should be slit upwards in the manner practised for carnations, the bottom bark of the tongue being taken off. They require a considerable length of time in this way before they are sufficiently rooted to be separated from the parent plant. They should then be placed out in separate pots, and deposited in warm sunny exposures in the green-house, and managed as other plants of that sort.

In the seed method of raising the plants, which affords the strongest, they should be gradually exposed to the open air, and set out in warm protected situations during the summer, being returned to the green-house as the autumn approaches, having as much free air and sun as possible. They require little water in the winter, but frequent small refreshings are necessary while they are placed out in the summer.

These plants have a pleasing ornamental effect, and afford an agreeable variety in the green-house in the winter season, as they do not stand in need of artificial heat.

BORCOLE. See **BRASSICA**.

BORDER, a narrow stripe or portion of ground running along the sides of the walls or other fences that inclose gardens and ornamented lands, and which bound the walks, or serve to separate the different principal divisions of the former; the earth being usually laid up in a gently-sloping manner from the front to the back parts.

These compartments are either of the useful or ornamental kind.

Those of the first sort are such as are carried round the walls of garden-grounds, and which are mostly employed, especially where the aspect is to the south, in planting out various sorts of fruit-trees upon, such as apricots, peaches, nectarines, cherries, figs, plums, apples, pears, &c. in order to their being trained to them, so as to form wall-trees, as well as extremely useful in raising different early esculent herbs, roots, and leguminous crops on; and in the other aspects for the sowing, rearing, and pricking out many sorts of seeds and plants on, in the summer season, that require at particular periods of their growth a cool situation or a degree of shade. The general rule in laying out these borders is that of making them have breadths in proportion to the height of the walls or railings towards which they are formed, which should never be less than eight or twelve feet. They were formerly made not more than five or six feet in breadth, which is too narrow for convenience in the culture of plants or the management of the trees that may be planted on them.

When trees are to be planted as espaliers, ten or twelve feet are the breadths that should in most cases be allowed.

Borders intended for the raising and growth of different sorts of flowers on, or for small shrubs, herbaceous plants, and flowers, being planted out in assemblage or mixture with each other, five or six feet in the former and eight in the latter may be the proper breadths for the purpose.

Their depths when trees are to be planted should never be less than two feet at the walk, gradually increasing to three at the back or fence: some sorts of fruit-trees, however, require much more, as pears and plums. In other cases, one foot at the walk and two at the back may form a sufficient depth and slope for the perfect culture of the crops that may be grown upon them. For flowers and the small sorts of shrubs it is often convenient to have them a little rounded on the surface.

There is another sort of useful border, which is that which divides or surrounds the principal compartments or divisions of kitchen-gardens, and which immediately bounds the main walks, as being convenient for planting ranges of dwarf apple, pear, plum, cherry, medlar, and other trees upon as espaliers, as well as for the culture of many herbaceous esculent plants; the line of espalier trees in these cases being planted at least three or four feet from the outer edges, so that there may be a three- or four-foot border on the outsides next the walks, and a smaller one on the insides of the espaliers; the broader outside borders serving for the rearing and culture of many low-growing esculent plants, and sometimes, where the kitchen and flower-garden are united, as a flower-border. The smaller inward borders may be found useful in raising many sorts of small plants and herbs, as lettuces, &c. See **ESPALIER**.

In borders of the latter or ornamental sort, as those of pleasure- or other grounds, they must be formed according to circumstances. It was formerly the taste in many places to have almost every walk bounded on each side by a border embellished with various ornamental plants; this taste has now, however, in a great measure given way to that of planting only on one side. A fine walk, ornamented on each side by spacious borders fully planted with curious flowering shrubs and other plants, has notwithstanding a fine appearance and good effect in many situations.

Borders of curious flowers, carried along the boundaries of grass-plats or lawns contiguous to the house, whether formed in a straight or serpentine manner, produce an agreeable effect and much variety.

Borders for particular kinds of flowers, such

as the curious sorts of hyacinths, tulips, ranunculuses, anemones, carnations, and various others, may be made either along the sides of walks, or detached in other parts of gardens or ornamented grounds.

Where the situations in which the borders are made are of the more moist retentive kinds, having clayey or gravelly cankerly bottoms, proper drains should be formed and conducted along the fronts of the borders, to the full depth of the sub-soils, in order effectually to convey off the injurious wetness that may take place, and allow of a suitable bed being formed for the upper soil. This is often done by paving the bottoms of the beds with tiles or bricks. But a much less expensive and at the same time effectual method is advised by the author of the "Scotch Forcing Gardener," which is that of letting the bottoms belaid in a sloping manner from the walls to the drains, a fall of six inches being given, first with a layer of good loam two inches in thickness, spread evenly and well rolled down; then a similar stratum of clean pit or river gravel applied over it, and forced down in the same manner: upon this another coat of loamy earth is to be deposited to the thickness of an inch or more, and well pressed down; the whole being executed while the materials are in a rather dry condition; the whole being afterwards a little moistened and well rolled down till the surface becomes glazed, the waterings and rollings being continued alternately till the whole acquires a shining hardness, and the gravel begins to show itself clearly through the loamy coat. In this way it is asserted a bottom may be formed, through which the roots of no trees can penetrate, and which is, at the same time, perfectly favourable to the growth of trees and plants.

In constituting the borders, those substances and mixtures of different materials which are most adapted to the growth and success of particular sorts of trees or plants, will be explained in describing the culture which they require.

Where the raising and growth of most sorts of culinary vegetables are the principal objects of borders, there should be constantly a due proportion of good vegetable mould in combination with a proper quantity of rich, mellow, loamy earth, a suitable portion of well-rotted stable-dung, according to circumstances, being incorporated with them, to produce crops in the greatest perfection.

Such borders as immediately bound or verge gravel- or sand-walks, should be planted on the sides with edgings of some dwarf evergreen sort of plants; such as those of box, thrift, daisies, pinks, &c. but the first is the neatest

and most durable plant for this purpose. See *BUXUS* and *EDGING*.

These borders should always be raised two or three inches, or more, above the common surface level, such as are detached being generally finished off in a gently swelling or rounding form, in order that they may afford the fullest effect.

BOSEA, a genus affording a plant of the shrubby exotic kind. The Shrubby Golden-rod.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Diadelphia*.

The characters are: that the calyx is a five-leaved, equal perianthium: leaflets roundish, concave, and erect, thinner at the edge: there is no corolla: the stamina consist of five subulate filaments, longer than the calyx: the anthers are simple: the pistillum is an ovate-oblong, cuspidate germ: the style and the stigmas are two: the pericarpium is a globular, one-celled berry; one seed, round and acuminate.

The only species is the *B. Yervamora*, Golden-rod Tree.

This is a rather strong woody shrub, with a stem as large as a middling person's leg; the branches come out very irregularly, and make considerable shoots in summer, which should be shortened every spring, to preserve the heads of the plants in any tolerable order: these branches retain their leaves till towards the spring, when they fall off, and new leaves are produced soon after: the bark is reddish-brown, and smooth; the wood being white: the leaves are two inches long, and one and a half broad, roundish, broader at the base, blunt at the end, and white underneath, resting on short petioles: the ribs purple. The flowers come out of the ends of the twigs, on alternate pedicels, at the base of which is a stipule: the calyx is purplish, and six-leaved: the seed of a black colour.

It is a native of the Canary islands.

Culture.—The plants in this species may be increased, by planting cuttings of the young shoots, in the early spring months, in pots of light fresh mould, placed under glasses, or in a moderate hot-bed, by which their striking root may be much expedited.

It is deposited in the green-house in assemblage with others of similar growth.

BOSQUET, a term applied to detached clumps, or other parts of gardens, pleasure- or ornamented grounds, planted with a variety of deciduous and evergreen trees or shrubs, and herbaceous perennial flowers, either in a regular or irregular manner. They should be laid out in forms suited to the nature, extent, and particular circumstances of the ground, so as to produce

the greatest possible variety and effect, some being made circular, others oval or oblong, and with bendings, sweeps, or swells, outward or inward, and larger or smaller, as may be necessary. They may be dispersed with the greatest effect on the confines of extensive lawns or other open spaces, in grass, also in parks, paddocks, the terminations of spacious avenues, and carriage-ways leading to the houses, especially when of considerable dimensions, being varied in situation, and distributed at such distances as to leave large intervening spaces of open land in grass.

In the planting of compartments of this nature, in order to produce the best effect, much attention should be bestowed in regulating the sizes of the plants, their shades, and times of flowering, as well as in the disposing them in the order of their different growths, so that they may rise regularly from the sides to the centres, and display themselves in the best and most advantageous manner in their heads and branches.

It was formerly the practice to plant trees and shrubs of the deciduous and evergreen kinds chiefly together in separate patches, but by a judicious mixture of both sorts a great richness and variety of effect is produced. Various sorts of tall herbaceous perennial plants, as well as low flowering ones, may be introduced on the sides and edges, such as those of golden-rod, and other similar kinds, with daffodils, violets, polyanthuses, primroses, and many others of the same sort.

In the less extensive sorts of ornamented grounds, these sorts of bosquets should always remain perfectly open, and wholly exposed to view, in order that the full variety of the plants may be seen; but in extensive parks, and other similar grounds, where they are chiefly planted with the more large and coarse hardy trees and shrubs, they may be inclosed by open hurdles to defend them from the cropping of cattle or other animals, especially until they have acquired a sufficiently large growth.

These clumps, after being thus planted, only require the earth among the plants to be slightly dug over in the autumn or very early spring, and once or twice hoed over in the summer to keep weeds from rising; the dead wood and irregular branches of the different plants or trees being cut out, shortened and removed, to preserve them distinct and keep them in due order. See CLUMP.

When well arranged, and kept in neat order, these sorts of bosquets produce much diversity and ornamental effect, both in large gardens and pleasure-grounds.

BOWLING-GREEN, a spacious plat laid evenly with turf, in pleasure- or other grounds, designed for the purpose of ornament as well as amusement in the summer season by bowling upon. These sorts of compartments should mostly be formed as near the habitations as possible, being laid out on the back or side fronts, so as to serve by way of lawns to such parts; or they may be situated at the terminations of walks or avenues. They may also be contrived amidst detached contiguous plantations, or wilderness quarters, to serve as portions of sward ground, or as openings to such places, and should always have tall trees so situated on the boundaries as to afford shade, especially in the afternoon.

The dimensions must vary according to circumstances; but where there is scope of ground sufficient, they should not be less than from half an acre to an acre. The most common form is that of a square, moderately extended; but some are made oblong, others circular; though, to suit the general plan or figure of the ground, they may be of any other form, so as to avoid the garden ground. Their boundaries may also be a spacious planted border, of either the straight or serpentine kind.

The plane or surface of the green should be perfectly level, and as high at least as the general level of the adjoining ground, so as that it may be always preserved free from stagnant water.

In forming these plats, the surface should be levelled in the most exact manner, and laid with the finest grass-turf that can be procured from a close, pasture, common, or down. See TURF.

The extents and proper levels of the greens being then set out with stakes, placed round the extremities or boundaries at fifteen or twenty feet distance, on which are marked the determined levels of the ground, and from which, on the opposite sides, levels in other cross-ways at the same distances should be made; and then, according to these levels, proceed by line and spade to form the ground to a proper surface, making it up firmly in lines from stake to stake; the pannels or spaces between being made up equally firm and regular, so that no part may sink in hollows afterwards. The whole should then be raked level, and finished off evenly and smooth: two or three inches deep of light sandy soil, or any light dry poor earth, may then if necessary be laid evenly over the surfaces, as equal in quality as possible, as by that means the turf or grass will form a more fine, regular, and even sward.

The grassy surfaces should always be formed

by laying them with fresh cut turf, as being superior to the method of only sowing them with grass seeds.

The turfs should be cut each a foot wide, a yard long, and about an inch thick, and laid with exactness, closely joining them edge to edge; then beating them well down with large wooden beaters, repeatedly rolling them with a large heavy iron roller. The best season for performing work of this sort is the autumn or very early spring; but the first is to be preferred where it can be conveniently done, as the turf has time to establish itself well before the hot season sets in. See **TURING**.

In order to keep bowling-greens neat after being thus formed, they require frequent mowing in summer, probably once a week or oftener, in order to keep the grass sufficiently fine and short for bowling on, as well as occasional rolling to preserve the surface firm and even. When worm-casts are much thrown up over their surfaces, they should be poled to break and scatter them, and then well rolled down with a wooden roller, to which the scattered earthy particles may adhere, and the surface be thereby rendered more clean. See **POLING-GRASS**.

Where coarse weeds appear, such as the dock, dandelion, &c. they should be immediately eradicated from the very bottom, in order that they may be prevented from scattering their seeds and multiplying themselves, by which the turf would be rendered unfit for the intended use, and at the same time have a disagreeable appearance.

BOX-THORN. See **LYCIUM**.

BOX-TREE. See **BUXUS**.

BRASSICA, a genus comprising various esculent plants, of the Cabbage, Borecole, Kale, Colewort, Cauliflower, Brocoli, and Turnip kinds.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosae*.

The characters are: that the calyx is a four-leaved, erect perianthium: leaflets lanceolate-linear, concave-channelled, gibbous at the base, erect, parallel, and deciduous: the corolla is tetrapetalous, and cruciform: the petals are subovate, flat, expanding, entire, gradually lessening into claws, nearly the length of the calyx: four ovate nectareous glands; of which there is one on each side between the shorter stamen and the pistil, and one on each side between the longer stamens and the calyx: the stamina consist of six subulate, erect filaments; of these, two opposite ones are of the length of the calyx; and four longer: the anthers are erect, and acuminate: the pistillum is a columnar germ, the length of

the stamens: the style is short, the thickness of the germ: the stigma capitate, and entire: the pericarpium is a long silique, somewhat like the shaft of a column, but flattened on both sides: partition with a prominent columnar top, two-celled, two-valved; valves shorter than the partition: the seeds are many and globular.

The species principally cultivated for culinary purposes are: 1. *B. oleracea*, Common Cabbage; 2. *B. Rapa*, the Turnip.

The first, or common Cabbage, as it is found in its wild state on the sea-shores of this country, has the stem-leaves very much waved, and variously indented; the colour is sea-green, but frequently with a mixture of purple; the lower ones somewhat oval and sessile, the upper almost linear: the flowers are large: the leaflets of the calyx ovate, broad and yellow: the siliques short and swelling: the root is biennial; the stem upright and fleshy, having a large head of oblong roundish leaves, which in some of the varieties are large, close, and compact, but in others loose, spreading, and open.

All the different varieties of cultivated or Garden Cabbage are supposed to proceed from this species. Those in most general culture are, the Heading Common Cabbage, *B. oleracea capitata*, of which there are several sorts or varieties, some coming into perfection during the summer season, others in the latter part of the autumn.

Of the first sorts there are the early summer kind, as the Small Round Early Cabbage, and the Large Oblong Early Cabbage; the former coming into use in the beginning of May, and the latter towards the end of the same month; the Sugar-loaf kind, as the Early Dwarf Sugar-loaf Cabbage; Large Hollow Sugar-loaf Cabbage: the first, coming in early in June, is very fine while young; the latter is in perfection the two following months, and is highly valuable for family use; the Early York Cabbage, which is a roundish oval quick-heading cabbage, that comes into use from May till July, and which is valuable as a principal early and summer crop, as well as for light cabbages in the autumn and winter. The Early Battersea Cabbage, which is of similar shape and growth, is ready early, and excellent while young. The Early Russia Cabbage is likewise very useful in the same state.

Of the latter, or autumn and winter sorts, are, the Common Round White Cabbage, which is hardy, of a middling size, round, and very white, coming into use in the latter end of summer, as August and the following month. It is an useful sort of cabbage. The Long-sided Cabbage, which is large, and of an oblong

shape, and comes into use about the same time, continuing till November, is also valuable. The Hollow Cabbage is likewise a large and good tender sort, being fit for use nearly about the same period. The Drum-head or Flat-topped Cabbage is a large hardy kind, for late use; but is now chiefly cultivated for cattle. The Musk Cabbage, which is a middle-sized, tender, crisp kind, having a musky scent and continuing good till a late period. The Giant or Great Scotch Cabbage, which is a close-heading large sort, continuing for late use. It is much employed for cattle. The American Cabbage is also a large good kind, as likewise the Devonshire Cabbage, but chiefly for field culture. The Red Cabbage, which is a thick-leaved, close-heading, hard sort, of a deep red colour, principally employed for the purposes of pickling or sallads, from the beginning of autumn till the following spring.

The Savoy Cabbage, *B. ol. Sabauda*, having a roundish, oblong, closely-cabbaged head, constituted of roundish, crumply, curled leaves.

The varieties principally cultivated of which are: the Common Green Savoy, the Large Green Dutch Savoy, the Yellow Savoy, the Round-headed Savoy, the Oval-headed Savoy, and the Sugar-loaf Savoy.

These are all excellent cabbages for winter use, as standing the frosts better than most other sorts, and forming large heads without cracking.

Fimbriated Open Cabbage, or Borecole, *B. ol. fimbriata*, which has a tall stem, with an open loose head at the top, constituted of oblong, cut, fimbriated, curled leaves, spreading openly without any tendency to cabbage.

The principal varieties introduced into cultivation are: the Green Curled Borecole, the Red Curled Borecole, the Thick-leaved Curled Borecole, and the Finely-fringed Borecole.

The perennial sorts of Borecole, with variegated leaves are also sometimes cultivated as ornamental plants.

Siberian Borecole, Scotch Kale or Kale, *B. ol. sabellica*, which has a strong stem topped by a large open head, formed of oblong, roundish, broad, thick, cut, curly leaves, but which does not cabbage.

There are several varieties in culture; as the Reddish-brown Kale, Dark-red Kale, and Green Kale.

Green Common Open Colewort, *B. ol. viridis*, which has a short stem with an open head at the top, constituted of leaves of a somewhat oblong form, without cabbaging.

Turnip Cabbage, *B. ol. napobrassica*, which has the stem and root swelling out so as to form

turnip-shaped bulbs, being crowned with a head of open oblongish leaves which do not cabbage.

The cultivated varieties are, the Turnip Cabbage with the bulb above the ground, and the Turnip Cabbage with the bulb below the ground.

Clustered Brassica, or Cauliflower, *B. ol. cauliflora botrytis*, which has a rather short upright stalk, topped by an open head of oblong, narrow, plain, entire leaves, which do not cabbage, but contain a clustered flower-head in the middle.

The varieties employed in cultivation are, the Early Cauliflower, and the Late Cauliflower.

Though this is supposed a variety of the common Cabbage, improved by cultivation, there seems a specific difference between the two plants, both in their growth and produce; as in the common Cabbage they are broad, roundish, and thick, while in the Cauliflower they are long, narrower, erect and pointed, as well as less numerous.

They are easily distinguished when the plants are young; the former putting out one upright stem from the centre, which afterwards divides into several branches; while the latter sends out many flower-stems from the part which is eaten, which is a compact collection of the heads of these stalks, dividing afterwards into so many stems, and branching out into many spreading shoots, so as to form a large spreading head when in flower, but never rising pyramidically as in the former.

The Cauliflower is said to have been first brought to this country from the island of Cyprus.

Italian Cabbage, or Brocoli, *B. ol. Italica*, which has a strong erect stalk, with a large open head at the top, constituted of dark and light green oblong plane leaves, not cabbaging, but forming a clustered flower-head in the middle.

The varieties usually in cultivation are: the Early Purple Brocoli, which is a plant of moderate growth, producing smallish purple heads at an earlier period than in the others; the Purple Brocoli, the Green Brocoli, and the Blue Brocoli. And in the Late Purple Brocoli, which grows much stronger and forms larger and more perfect heads, they are the Purple-headed Brocoli, Dwarf Purple Brocoli, Blue Brocoli, Brown Brocoli, Green Brocoli, and Yellow Brocoli.

The White or Cauliflower Brocoli, which is a curious sort that grows strong and forms large close heads resembling those of the Cauliflower.

The Black Brocoli, which is a hardy sort growing high, but producing in general smaller and

less perfect heads than the others. Of this there are the Dark or Black-headed; the Brown, and the Blue.

All the varieties of the different sorts are frequently produced by the same seed; but they may be kept in a great measure distinct by proper care in the culture.

The second species of this genus, the Turnip, is sufficiently known by its round fleshy roots; which however vary exceedingly in their form, size, and colour, in a cultivated state, in which only they are apt to be viewed. The leaves which arise immediately from the root are very large, of a full green colour, rough, and jagged or gashed almost to the midrib. From the midst of these, early in the second season of its growth, springs a stalk four or five feet high; the leaves on which are very different from the root-leaves; being oblong, pointed, embracing the stem, smooth and glaucous. The flowers are yellow, and placed on long, slender, smooth peduncles: the siliques or pods are cylindric; and the seeds are of a reddish-brown colour, not unlike those of Cabbage.

There are many varieties, chiefly distinguished by the form of the bulb or root, and which proceed from the difference of soil, situation, and culture. The principal employed in the garden are the Early Dutch Turnip, the Early White Stone Turnip, the Large Later Stone Turnip, and the Early Red Stone Turnip. These are the best and most proper sorts for the early spring and summer crops; the bulbs or roots being of a moderate size.

The White Round Turnip, the Green-topped Turnip; both of which form large roots, and are proper to succeed the above sorts as garden crops.

The Red-topped Turnip, the Yellow Dutch Turnip, the Oblong White Turnip, the Tankard Turnip, the Large Norfolk Turnip, and the Hardy Russia Turnip. These are most commonly made use of as field turnips, as being large-rooted, and of pretty hardy growth. They may however be cultivated in the garden as winter and early spring crops, especially the last sort.

The Long Round French Turnip, and the Purple Turnip. The former of these, from its long small root, is of little use in gardens; and the latter is principally cultivated for its singularity. There are other varieties, but these are sufficient for our purpose.

Culture in the Cabbage kind.—The Cabbage is a sort of plant that may be raised on almost any sort of soil, but succeeds to most advantage on those of a rather strong loamy nature,

and which have a good depth. The ground in its preparation should be well dug over to a full spit depth, and a sufficient proportion of well rotted stable-dung incorporated with it; or, when it is of the more light or sandy kind, cow-dung may be employed for the purpose, and when very stiff, some sort of calcareous material may be made use of, with different kinds of ashes.

The most proper situations for these crops are those of the more open and exposed kinds which have a rather southernly aspect.

In the culture of these plants it is usual to distinguish them into summer and autumn kinds, from the crops coming into use at these different periods. The seed for the former should be sown about the first or second week in August, and till the beginning of September, but not later; and for the latter every three or four weeks from the beginning of February till the end of May, according as successions are wanted.

The plants of the autumn sowings should be set out principally in October and the following month, and the remainder about the middle of February, after being preserved during the winter; and those of the spring sowings as they become in a proper state for the purpose from April to the end of June.

In order to raise the plants in the best perfection, a piece of rich mellow ground in an open situation should be employed, which should be well dug over, and formed into as many four feet wide beds as may be necessary, the surface being raked in an even manner. Seed of the different varieties should immediately be sown separately upon them, rather thinly, but as regular as possible, being lightly raked in. It is of much importance to the success of the sowings to have new well ripened seed. If the weather be moist the plants soon appear, but when dry it is of great utility to water the beds occasionally. It is the usual practice when the plants have attained a proper size, as when the leaves are an inch or two in breadth, to prick some of the strongest plants out into other similar beds, in rows six inches apart, and three or four inches from plant to plant, to remain till the time of setting them out; a plentiful watering being given at the time: but where the seed has been sown sufficiently thin, and the plants kept properly thinned out and perfectly free from weeds, this operation is unnecessary, the plants remaining in the seed-beds without sustaining any check in their growth by being pricked out.

In finally setting out the plants, portions of ground in open situations should be provided, and prepared for the purpose, by digging them

well over, and incorporating with the soil a suitable quantity of well-rotted stable-dung. The plants are then to be put in with a line and dibble, in rows at suitable distances, according to the kinds, the quality of the soil, and the seasons of planting. For the small early sorts from eighteen inches to two feet from row to row, and from twelve to eighteen inches in the rows; but for the larger sorts a distance of two feet and a half every way should be allowed. Some advise for the more early summer crops much narrower distances in the rows, in order that the plants in each intermediate row may be cut in the early spring as greens, the others being left to form cabbages; which in many cases is probably a good practice: and when wanted as young cabbages, they may be obtained more early in this season by having them tied up with bass. When the crops set out in the autumn are much injured by the severity of the winter, the places of the destroyed plants should be filled up as speedily as possible from those in the beds.

It is not necessary to sow or plant out such large crops of the smaller more early sorts as of those of the larger and more late kinds, as they will not continue so long fit for use.

The Red Cabbage crops may be sown and set out at the same periods as in the common sorts; but the principal crops should always be planted out in October and April, on good ground, in open exposures well prepared by digging and the application of manure, being set out at greater distances than in the other crops, as from two and a half to three feet.

In the Savoy kind the plants are raised by sowing fresh seed at different times, as in August, and from the beginning of February until the middle of April or later. These sowings should be made as in the preceding cases, and the plants be managed in the same manner.

Some of the autumn-raised plants may be set out in October and the following months, if open weather, and wholly in the beginning of spring; and those raised from early spring sowings should be planted out finally as soon as the plants are of proper growth. The general crops of the later spring-raised plants may be planted out occasionally as ground is cleared, from May till August; those planted out early being set two feet and a half distant every way, and the next crop about two feet; but the latter plantings need not be planted at more than a foot and a half distant.

It is sometimes customary to plant out the summer crops of these plants between rows of forward beans, peas, kidney-beans, cauliflowers, early cabbages, and other plants that

stand distant in rows, and are soon to come off the ground; as by this practice some time is gained: but the plants are generally finest when they are planted out in a clear open spot of ground, previously well dug over for their reception. In performing the summer plantings, it is of much advantage to choose moist weather for the work, otherwise watering must be employed several times till the plants have stricken root.

The only culture which any of the crops of this sort require after being finally planted out, is that of having the ground well hoed over among the plants two or three times, as the weeds advance in growth; and when the plants are sufficiently large, to loosen and draw up the earth well about their root-stems as often as may be necessary, in order to strengthen and promote their growth.

As the stalks of the summer crops of Cabbages afford considerable supplies of good greens, some of them should constantly be left in the ground for this purpose. The York and Sugar-loaf are the best in this intention.

In order to save seed, some of the best plants of the different varieties should either be suffered to stand where they grow, or be planted up to the heads in a dry piece of ground in the autumn, in order that they may run up to seed in the following spring, care being taken that they be as distant as possible from other sorts, lest they be made to degenerate. Some employ the stems that have been cut over for this use. The seed should be let remain till it is fully ripened, which is mostly about the latter end of July, or in the following month, when it should be collected by cutting of the pods, or taking the whole branches, and, when exposed a little to the sun, be thrashed out upon a cloth, and put up in bags for use. It is necessary to support the seedling-stems by sticks or other means, and to be careful in keeping the birds from devouring the seed as it begins to ripen.

It is the practice in many places to cultivate Cabbage-plants for the purpose of being eaten in their green state, or as they begin to form little central heads, as Coleworts at different seasons. The early sorts are the best for this use. The plants should be raised by sowing the seeds in the summer, autumn, and spring months, as directed above; and, when they are of sufficient growth, be planted out where they are to stand, in rows about a foot distant, and six or eight inches apart in the rows.

They only require afterwards to be kept free from weeds by hoeing, and to have a very little mould brought up about their root-stems. If

the leaves be tied up when they show for hearing, it renders them more forward, as has been already seen.

In cutting, especially with the spring crops, it is often the custom, where they are extensive, to take every other row, and sometimes every other plant in the remaining ones as they begin to heart, leaving the rest to cabbage in a more perfect manner. By these means a more abundant produce is afforded.

Culture in the Borecole kind.—The culture in the different varieties of these plants is much the same as in those of the Cabbage. The plants are raised by sowing the seeds annually, from March to the beginning or middle of April for the main crops, and a smaller portion in the beginning of May for a succession. They should all be sown in open situations, not too thick, and raked in;—a quantity of the plants, when the leaves are an inch or two broad, being pricked out four or five inches asunder, to remain five or six weeks to obtain a proper degree of strength; to be planted out finally in June and July, in rows two feet or two feet and a half asunder, and for the late crops early in August, planting these in rows two feet apart, and eighteen inches in the rows. Moist weather should be chosen for this purpose.

But it is probably a better method to let them remain in the seed-bed till the periods of setting them out where they are to remain.

A small crop may also be sown in autumn, or the beginning of August, to stand the winter in young growth, and be planted out early in the spring in order to be of the largest full size in the following autumn.

The plants require to be kept clear from weeds in their early growth, and to have the earth brought up well about their root-stems occasionally as they advance in size.

The sorts mostly cultivated are: the Green Curled Borecole, Red Curled Borecole, Thick-leaved Curled Borecole, and the Finely-fringed Borecole.

The plants mostly rise with a thick stalk often a yard or more high, surmounted by a large head of thick leaves, in some spreading horizontally every way, being finely fringed and curled, but in others growing more contracted. They never form close heads. In all, the stems produce numerous fine sprouts early in spring, closely surrounding them for some length, and which, as well as the principal or main top heads, boil exceedingly green and tender: the main heads come in for use in autumn and winter, and the sprouts early in spring.

The Siberian Borecole, or Scotch Cale, is another sort, some varieties of which grow tall

in the stem, with large open heads; others shorter and more strong in the stem, with larger heads of broad curly leaves, in some spreading out, and in others standing erect, but without any tendency to form close heads or cabbage. These are not so much in use as the above sorts; but as furnishing shoots plentifully after the heads are cut, they may be usefully cultivated for supplies in winter and early spring.

All the varieties are so extremely hardy as to be capable of withstanding, in a great measure, the severest winter seasons.

Besides these varieties of Borecole, which are cultivated for culinary purposes, there are others of the perennial kind, with variegated leaves and shrubby branching stems, constantly retaining their leaves, which are grown as ornamental plants.

These are mostly raised by planting the off-set-slips, or slips of the side-shoots, in the early spring or summer seasons, supplying them well with water till they have taken root, and become well established in the ground.

The Green Colewort is another plant of the Open-headed Borecole kind, that is sometimes cultivated for culinary purposes, though it has lately given way to the Cabbage Coleworts, as being less tender and sweet. It is raised by sowing the seeds in July and August, as in the Cabbage Colewort kind, and setting the plants out in open situations in the autumn and early spring months.

The Anjou Cabbage or Colewort is also of the Borecole kind, having a very large open head. It is raised by sowing the seeds and setting out the plants in similar situations and preparations of the land, and at the same periods as in the other sorts. But the plants must have more room allowed them. They likewise require the same sort of culture while growing.

Chou de Milan, or what is usually known by the title of *Brussels Sprouts*, is a sort of Open-headed Colewort, which is likewise cultivated for culinary uses, as affording abundant supplies of sprouts at almost all seasons.

The method of culture and increase with these is the same as in the other Coleworts, as well as by planting pieces of their perennial roots, which grow readily and increase very rapidly. Good ground well dug over and enriched by manure in an open exposure should constantly be employed for the purpose.

Culture in the Turnip-Cabbage kind.—The method of cultivation with plants of this sort differs but little from that employed in others of the Cabbage kind.

The plants are propagated by sowing the seeds annually in March, April, and June, on

beds, as in the Cabbage; the plants being set out from May to July or August in an open compartment, in rows two feet and a half asunder, keeping them clean from weeds, and drawing only a little earth about the bottoms of the stems occasionally. The turnip-part is usually fully grown by Michaelmas, and continues all winter for use.

They may also be sown where the plants are intended to remain, and be hoed out to a proper distance.

This last is probably the best method of culture.

There are two sorts cultivated; one with the turnip above the ground, the other with the turnip below the ground. The plants rise and proceed in their growth, as in the open Coleworts, till they begin to form bulbs.

It is the globular- or turnip-part of the plants that is used, being sometimes sliced in soups, and by some used as common turnips; but, unless employed when quite young, they are rank and unpalatable.

The chief merit of these plants is their hardiness, as they are capable of withstanding the hardest winter.

They require good ground well manured to bring them to any great size.

Culture in the Cauliflower kind.—There are, as has been seen, two sorts of this plant cultivated in the garden, the Early and the Late Cauliflower; but they differ only in the former coming in a little sooner than the latter.

It is customary among gardeners to have three or four crops of this vegetable in the course of the year; as an early summer crop, a main summer crop, a late summer crop, and an autumn, or what is often termed a Michaelmas crop. These different crops are obtained by sowing and setting out the plants at different times. The most proper times of sowing for the two first crops are in the latter end of July and beginning of August; and for the two last in the latter end of January, the middle of March, and the beginning of May. These sowings should be made in open situations where the soil is light, mellow, and of a good quality, the ground having been prepared by digging it well over, and raking the surface even. The seed should be sown rather thinly, and covered by raking or sifting a little earth lightly over it. It is of much consequence to have the seed perfectly new and fresh, and such as has been collected from the best and most perfect plants. The January sowing may be made on a slight hot-bed, the plants being afterwards managed as directed below.

When the weather is drouthy, gentle water-

ings may be necessary in the evenings before as well as after the plants appear; and when it is very hot, it is useful to shade them a little in the middle of the day. The plants are commonly up in the course of a week or ten days. After this they only require to be kept clean from weeds, and to have water given them occasionally till they have leaves of about an inch or two in breadth; when it is mostly the practice to prick a quantity of the finest plants out into other beds of good earth, in rows at the distance of five or six inches, and four or five in the lines. All the deformed and black-shanked plants should be laid aside as useless. After the plants have been thus pricked out, a moderate watering should be given, especially when the weather is dry, and repeated as there may be occasion. The plants raised on the hot-bed, as well as some of those from the autumn seed-beds, may be pricked out at once into the frames where they are to remain during the winter. In these situations they are to continue, air being freely admitted when the season will admit, and the plants occasionally refreshed with water. They should also be well guarded against frosts and cold, until the periods of their being set out where they are to grow and form heads.

Some of the plants of the first sowings should be set out in the autumn, as in October or the following month; and the rest about the middle of February or the beginning of the following month, under glasses or some other sort of protection; and those of the other sowings in the beginning of April, and in May, June, and July, according as they were sown.

For the purpose of planting out these sorts of plants, proper beds of the richest mellow ground, in the best defended and warmest part of the garden, in a free exposure to the full sun, should be provided, being well dunged with the best rotten horse-dung, such as that of old cucumber and melon beds, or any other of similar quality, spreading it equally over the ground, at least three or four inches thick; and the whole then regularly trenched in one good spade deep, burying the dung equally.

Where the plants are to be situated under glasses, the ground should be formed into beds a yard wide, with foot-wide alleys for the convenience of going in, to raise and set off and on the glasses; but in other cases this is unnecessary.

In the first method, the plants are then to be put in, allowing three to each glass, though the London gardeners often plant more; but two of the best are enough to be left to come to perfection. At the time of planting them out, a quantity of the handsomest, straight, clear-shanked plants should be chosen; which being ready, a

line should be stretched along the middle of the beds, and at every yard distance three plants put in a triangle, six or seven inches or more apart, a little water being given afterwards, and the glasses put on, which should be kept close about ten or twelve days, when the plants will have taken fresh root; then prop them up on the sunny side about three inches high with forked sticks, or pieces of brickbats: or wooden pegs fifteen inches long, each having two or three notches an inch or two above one another, to receive the edge of the glass, may be more convenient, as, by sticking them in the ground, the glasses may be readily propped higher or lower on any side, as occasion may require.

During winter, the glasses should be kept almost constantly over the plants, only keeping them tilted on the props in mild weather, on the warmest side, for the admission of air: in fine mild dry days, the glasses may however be set quite off; which, if the plants be forward in growth, should be practised at all opportunities, lest, by too constant glassing, they be drawn into flower in their small winter growth and rendered useless: but the glasses must always be put over the plants at night, and when cutting winds or frosty weather prevail, kept close down. In severe frost they must also have long litter laid close about the lower part of each glass, raising it higher as occasion shall require.

In their spring culture they must be thinned out about the beginning or middle of March, to one stout plant or two at most under each glass, though, in large bell-glasses, the market-gardeners frequently leave more, for the sake of having the advantage of the glasses to bring as many as possible to early perfection. The others should be planted out into another place, as a piece of the same rich well-dunged ground, the plants being raised with the point of a trowel, to preserve the fibres of their roots, and planted two feet and a half distant each way, water being given immediately to settle the earth about their roots.

The plants under the glasses should have the earth directly made good about them, and a little mould drawn up about their stems, continuing to cover them occasionally with the glasses, which must now be raised considerably on props, in proportion to the advanced growth of the plants; not omitting to let them have the benefit of the full air in mild days, and that of warm showers, by occasionally setting the glasses wholly off. The glasses are to be continued occasionally over the plants until the middle or latter end of April, or longer if it be necessary.

When the plants are so far advanced as that the

leaves press against the glasses, they should be raised, by forming a border or ridge of earth round each hole of plants, three or four inches high, on which the glasses should be set, continuing to prop up one edge occasionally as before: and according as the plants advance in growth continue to prop up the glasses on every side three or four inches in height. As the length of the days and warmth of the weather now increase, and the plants grow freely, they require as much free air and scope to grow in as it is possible to allow them under the glasses. At the same time care should be taken to continue to expose them occasionally to the full air in fine days and moderate warm showers, defending them with the glasses in the nights, and in cold rains or boisterous weather, until it becomes warm, and the plants are grown too large for the glasses; when they should by degrees be fully exposed night and day, till the use of the glasses be wholly unnecessary.

At this period, if the weather be hot and dry, moderate waterings will be of utility in promoting the progress of the plants as well as increasing their size and strength.

In planting out the summer crops from the plants that have been preserved in frames or other situations and those plants raised from seed in the spring months, open spots of ground prepared in the same manner as those for the other crops should be provided; and the plants be put in by a line and dibble, to the distance of from eighteen inches to two feet or more each way, water being immediately given if the weather be not moist, and occasionally repeated till they have taken fresh root.

It is the practice sometimes with market-gardeners, in order to make the most of their ground, to sow thin crops of radishes and spinach between the rows of cauliflower-plants; but this is not by any means adviseable in other cases.

The chief circumstances to be attended to in the planting of these sorts of crops are: those of providing good healthy strong plants; preparing the ground with due attention; using a suitable proportion of manure; setting them out in due time, not setting the plants too deep in the ground; and to prevent their being injured by damps and the slug.

The culture which all the different crops require is only that of keeping them perfectly clean from weeds by occasional hoeings, and the drawing up the earth about the roots of the plants two or three times as they advance in their growth. The more perfectly this business is performed, the more vigorous is the growth of the crops.

When the plants of any of the crops, but especially those of the earliest, begin to show flower, they should be examined frequently, and, where they are found, the inner leaves turned down over the heads to screen them from rain, the sun, and full air, in order to preserve them more white and close; as, when fully exposed to the weather, it generally changes the fine white colour to a yellowish hue, and occasions the head to open before it becomes perfectly formed.

The excellence of the plant consists not only in size, but in the whiteness and compact curd-like growth of the head; such as have a frothy loose appearance being inferior in value.

It is in its utmost perfection of growth when the outward parts of the head begin to open and expand; after which the whole soon divides, and shoots up to flower and seed.

In cutting these crops, the flower-head should mostly be cut off with some inches of the stalk, together with most of the surrounding leaves, which should be trimmed down nearly equal to the circumference of the head, especially when for present use; but, when required to be kept a few days, and such as are intended for market, should have the full leaves to continue, trimming them off as wanted. As the stalks of these plants never produce sprouts, as in those of the cabbages, they should be removed as soon as the head is cut.

It is common in some places to preserve some heads of the latest crop in dry cellars or other places, by taking them up with their roots, and putting them in sand, keeping them as dry as possible, and carefully removing such parts as decay.

Saving seed.—It is of great importance to have good seed in the culture of this plant, which cannot be obtained without saving it, as that which is purchased can seldom be depended on. For this purpose, some plants of the earliest crops are to be selected, which have the largest, most perfect, compact, firm, white heads, and permitted to remain to run up to stem and form seed, which is usually perfected about the beginning of September. The plants should be well supported, and the seed be collected as it ripens, care being taken to guard against the birds. Some should be saved every year, as old seed cannot be depended upon.

Culture in the Brocoli kind.—There are, as has been seen, several sorts of this plant in cultivation; but the Brown, Green, and Purple succeed best for early crops, and the White for the principal and late crops.

All the different varieties of Brocoli are raised from seed sown annually in the open ground.

The season for sowing the main crops of all the varieties is March and April for the autumn and winter production, and May and the beginning of June for the principal succession crops, to come in for the spring supplies.

Some may occasionally be sown so early as February or beginning of March of the Cauliflower Brocoli; as also any of the Purple kinds, in order to obtain an earlier autumn production.

The seed should be sown on a good soil in an open exposure, as the plants rise much stronger than on narrow borders under walls. Each sort should be sown separate, not too thick, on the surface, raking them in lightly: the plants appear in ten or twelve days; occasional waterings being given in dry weather; and when they have leaves an inch or two broad, it is proper to prick them out in a nursery-bed three or four inches apart, giving them water as soon as planted, and occasionally till they have taken root; in which bed let them remain a month or six weeks to acquire strength: by these means their shanks will be short and of robust growth, and be considerably better prepared for planting out where they are to stand than those which remain in the seed-bed.

The times of planting them out are; June, July, August, and the beginning of September, according as they were sown, or are desired for use.

The ground for setting them out upon should be good, well prepared by digging over, and enriched by good stable dung. The plants should then be planted in rows two feet and a half asunder, and two feet distant in the lines; but for those planted late two feet at most between row and row is sufficient, and eighteen inches distant in the rows. As soon as planted they should be watered; and if dry weather prevail the watering should be repeated every other day till the plants have got root.

The culture afterwards is, to keep them clear from weeds by hoeing the ground occasionally, and when they have advanced a little in growth to draw some earth with a hoe about their stems, which if repeated once or twice is of great advantage to the plants in promoting their growth.

In gathering them for use, attention must be had that the heads have attained their full growth, but which should be cut while they remain close, and before they begin to divide and assume a seedy-like appearance, and with about six inches of the main stalk to each head, as the upper part of the stalk eats exceeding sweet and tender; but which, previous to its

being dressed, must be peeled, or divested of the outer rind.

After gathering the main heads the stalks should be permitted to remain for the production of sprouts or smaller heads, which they afford plentifully, and which are as fine eating as the principal heads.

In saving the seeds of the different varieties, some of the largest and most perfect headed plants of each sort of the early crops should be selected, and managed in the same way as in the cabbage and cauliflower kinds, care being taken to keep the different varieties at as great a distance, and as distinct from each other as possible.

Culture in the Turnip kind.—There are different varieties of this root cultivated in the garden: but the Early Dutch is the best suited to the early and first general crops, and after it the Early Stone; and the Round White for a main summer crop. And for the autumn and winter crops, the White Round: the Green and Red-topped kinds are the most hardy.

The methods of raising all the sorts is by sowing the seeds in open situations, where the plants are to remain, as they do not admit of being transplanted with advantage.

The common season for sowing is any time from the beginning of March until the latter end of July; but to have a long and regular succession, it is necessary to make four or five different sowings at proper intervals, from the latter end of February till the middle of August.

The most proper soils for the culture of this root are those that are moderately light, as in strong land the roots frequently acquire a stringy texture and rankness of taste.

In garden culture the necessary space of ground to sow at a time for the supply of a family, is from about two to six, eight, or ten rods, according to circumstances, and the proper quantity of seed for each sowing may be from one to two or three ounces.

The ground should be prepared for the seed, by digging it over one spade deep, breaking the mould as fine as possible on the surface; the seed being sown, while the ground is fresh stirred, especially when the weather is hot or dry. A moist season for summer sowings is of great importance in this culture. The seed is mostly sown broadcast on the general surface, scattering it moderately thin with a regular cast, and even-spreading hand, raking it in evenly.

The plants appear in a few days after sowing, especially in moist weather; and in eight or ten weeks afterwards they are fit to draw.

It is of much advantage, when the weather

is hot, to steep the seed a few hours in water before it is sown; as by that means it germinates more quickly, and there is less danger of the plants being destroyed by the *fly*.

In the after-culture of the Turnip all that is requisite is, when the plants have two or three leaves, or are about a month old, to thin them out to six, eight, ten, or twelve inches distance, and clear them from weeds; which is effectually done by the hoe, and is best performed in dry weather.

At the same time the weeds should be removed and the surface well stirred over, as this proves highly beneficial to the growth of the crops.

The very early crops need not be thinned to more than five or six inches distance, especially if it is intended to begin drawing them as soon as they begin to turnip.

In three or four weeks after hoeing the plants will begin to turnip; and in five or six weeks, some be fit to draw young for use.

In the markets these roots are exposed clean-washed and neatly bunched up, in number from twelve to fifteen or eighteen, according to their size, in each bunch, and disposed of to the retailers by the dozen of bunches.

In saving the seed, some of the best roots of the autumn or winter crops should be permitted to stand where they were raised, to shoot up and produce seed, which should be collected, when fully ripened, by cutting off the stems from the bottom, and, after exposing them to the sun, thrashing it out.

BREAD-FRUIT-TREE. See *ARTOCARPUS*.

BROCOLI. See *BRASSICA*.

BROMELIA, a genus comprehending plants of the herbaceous perennial exotic kind for the hot-house. The Pine-Apple, &c.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronarieæ*.

The characters of which are: that the calyx is a three-cornered, small, superior, permanent perianthium; the divisions three and ovate: the corolla consists of three narrow-lanceolate erect petals, longer than the calyx: the nectary is fastened to each petal above the base, and converging: the stamina consist of six subulate filaments, shorter than the corolla, inserted into the receptacle: the anthers are erect and sagittate: the pistillum is an inferior germ: the style simple and filiform, the length of the stamens: the stigma obtuse and trifid: the pericarpium is a roundish berry, umbilicate, one- or three-celled: the seeds are numerous, incumbent, somewhat oblong, and obtuse.

The species chiefly cultivated for use and or-

namment are, 1. *B. Ananas*, Ananas, or Pine-Apple; 2. *B. Pinguin*, Pinguin, or Broad-leaved Wild Ananas; 3. *B. Karatas*, Karatas, or Upright Wild Ananas; 4. *B. lingulata*, Tongue-leaved Bromelia; 5. *B. nudicaulis*, Naked-stalked Bromelia.

The first is an herbaceous plant, which has a thick fibrous perennial root; the leaves being long, erect, narrow, sharp-pointed, and for the most part serrate on the edges, rising to the height of two or three feet, and somewhat resembling those of the aloe, only more thin and less succulent. The stem, which proceeds from the centre of them, is round, of strong growth, and supports the fruit near the top, which is erect, and mostly of an oval-oblong shape, being constituted of numerous tubercles, having above it a crown of leaves. The fruit, in its more young advancing growth, sends forth many small flowers of a bluish colour, proceeding singly from the knobs or tubercles. As these decline, the fruit begins to swell or increase in size, becoming fleshy and of a darkish-yellow colour, affording a highly fragrant smell. It is a fruit well known and highly esteemed on account of its delicious flavour. It is supposed to be a native of Africa, and is said to have been first raised in this climate by Sir Matthew Decker, at Richmond.

There are many varieties: but those of most importance for cultivation are, the Queen, the Sugar-loaf, the Montserrat, the King, the Smooth Pine, and the Green Pine. Other varieties are likewise known in cultivation: as the Black Antigua or Ripley; the Granada, with marbled leaves and very large fruit; the Bogwarp Pine, with broad green leaves; the Surinam Pine, with silver-striped leaves; with gold-striped leaves.

The first of the above varieties, or Queen Pine, is not so large as the Sugar-loaf, and the juice is more astringent; but it is in very general culture, and is said by Mr. Nicol to be more depended upon for a regular crop than any other.

The second sort, or Sugar-loaf Pine, is distinguished from the others by the leaves having purple stripes on the insides the whole length. The fruit is large, and when ripe inclines to straw colour. It is apt not to fruit in proper season.

The third, or Montserrat Pine, has the leaves of a dark-brown inclining to purple on the inside, and the knobs are rather long and flat. It is long in fruiting.

The King Pine is a large and very fine sort of fruit; but Mr. Nicol has found it to require less

water and more gravel in the mould and bottoms of the pots than other sorts.

The Smooth Pine is only cultivated for variety, the fruit being worth nothing.

The Green Pine is a scarce variety here, but is in high estimation in America: the fruit when well ripened is of an olive cast; therefore to have it green it must be cut early, when it is unfit for eating.

The Antigua Pine is large, and likewise of an excellent sort.

The second species has the leaves very thick about the root; and from the centre of these springs the stalk, which generally rises to the height of twelve or sixteen inches above the foliage, dividing into many little lateral branches, which bear so many single flowers. When the plant begins to shoot into blossom, all the leaves become of a fine scarlet colour towards the stalk, and continue so until the fruit begins to ripen; but it then begins to change, and afterwards fades gradually away. The fruits are separate, each nearly of the size of a walnut; the pulp has an agreeable sweetness, but joined with such a sharpness that, if it be suffered to lie any time in the mouth, it will corrode the palate and gums, so as to make the blood ooze out. From its having a tuft of leaves growing above the fruits, it has at first the appearance of the Pine-Apple; but the difference is obvious on examination, the fruits not being coadunate, as in that, but produced separately in clusters.

The third is an elegant plant, producing numerous radical leaves, which are of a subulate-linear shape, sharp-pointed, and edged with spines. The flowers are scentless, seated in the bosom or middle part of the plant, rose-coloured, with the calyx and germ downy. The length of the leaves in its native situation is six or seven feet. The fruits are oval, two or three hundred in number, and grow sessile in a heap or central group, surrounded by paleaceous expanded leaves or bracts; they contain a succulent whitish or yellowish flesh, under a coriaceous and yellowish bark. When ripe they are far from unpleasant, but in the unripe state they set the teeth on edge and excoriate the mouth. The economy of this plant in the preservation of its fruit to maturity is wonderful, being so protected by the spines of the surrounding leaves as to be secure from all injuries.

The fourth species has shorter leaves than the fifth, standing erect, narrow at the base, increasing in width gradually to the top, sharply serrate, and of a deep-green colour. The flower-

stem rises from the centre of the plant, dividing at top into several branches; the upper parts of these have close spikes of flowers, which come out alternately from the sides, each having a narrow entire leaf just below it, which is longer than the spike.

In the fifth, as well as in the preceding, the leaves are very like those of the Aloe, but not so thick and succulent; the edges are indented, and armed with strong black spines. The flower-stem is nearly three feet high; the lower part has entire leaves placed alternately at every joint; at the upper part are the flowers, set in a loose spike or thyrse. These are succeeded by ovate seed-vessels, having a longitudinal partition, in the centre of which, on every side, are fastened smooth cylindrical seeds.

Culture.—The cultivation of the Pine is more difficult, and requires a more exact and nice attention in its management in this climate than that of almost any other plant. It is only capable of being effected, so as to afford good fruit, by the assistance of the stove of the hot-house with the artificial aid of fire heat. And, in order to accomplish the business with the greatest ease and convenience and in the most perfect manner, besides the stove of the hot- or fruiting-house, others are necessary for the purpose of bringing the plants forward in, till ready to set out in the fruiting-stove, which are termed nursery-stoves, or pits, and succession-stoves.

And where large quantities of such plants are cultivated, it is also useful to have what are called bark-pits, formed either by a deep frame of wood, or of brick-work, six feet in width with sufficient length, five or six feet deep behind, and four and a half in front, having the top glazed, to make bark or other hot-beds in, for the immediate reception of the crowns and suckers from the parent-plants, and for preventing the succession-stove from being crowded too much.

When the whole culture of these plants is to be effected in one stove only, the plants must be raised and fruited together; by which practice not above one half of the stove or the hot-house can be occupied at one time with fruiting plants: besides, the young plants are often liable to be brought forward too rapidly.

All these different stoves and nursing-pits should be provided with proper flues and fire-places, so contrived as to work steadily and save fuel as much as possible, as upon this the expense of the culture of the plants in a great measure depends. See **HOT-HOUSE, STOVE, and BARK-PIT.**

It is remarked by Mr. Nicol, that stoves for this use are variously constructed. Some are single pitted; some double; and some even triple; some have flues running under, and some round the bark-bed. These he considers as being very dangerous to the roots of the plants if over-heated. He also disapproves of double and triple stoves; as being very uneasy to work in stormy weather, and confining a vast quantity of stagnate unwholesome air in dull hazy weather. A stove in which there is a perfect command of fire heat, and which admits a free circulation of air in all parts, is to be preferred; and none are so convenient for this purpose as single ones.

The situations for them should be dry, and the bottoms or floors raised above the surface ground. The common practice of having borders for vines to be trained up the rafters, Mr. Nicol considers as highly prejudicial to the Pine plants.

Preparation of the Bark-beds.—The next circumstance of importance in the culture of these plants is that of forming the beds in the stoves and pits. These are differently constituted, with different cultivators, and are designed for the purpose of plunging the pots with the plants into, in order to their due growth and support. These beds are mostly composed of tanners' bark, as being a substance that not only affords the most uniform and durable heat, but which is the best suited to the nourishment and growth of the plants and fruit, as well as the most manageable. See **BARK-BED.**

The great desideratum in the making of these beds is that of producing such an uniform moderate bottom heat as may not injure the roots of the plants, while it is sufficient to promote their regular growth. The author of *The Scotch Forcing Gardener* observes, that his idea of the quantity and quality of bottom heat, that is required by the Pine, is different from that generally entertained. He never wishes the plants, except in striking suckers, to stand in a bottom heat higher than that of blood heat at any time, and that too of a mild moist nature. If the watch-stick, to the depth of the bottom of the pot, feels just a little warm, applied to the hand or the cheek, when the body is of a comfortable temperature, it is sufficient; and he thinks it consistent with reason, that the bottom and superficial heat should correspond at all times. In order more effectually to attain this, and that the roots may sustain no injury, he has recourse to the following rules in forming, turning, and trenching the beds. He never sifts the tan in the pit, or adds above an eighth

of new, which, if necessary, he gives place to by skimming off a little of the surface of the old. The new tan is never suffered to lie within a foot of the surface; by which means the pots are entirely plunged in the old. He lays the half of whatever quantity of new tan is added in the bottom of the trench, and divides the other equally to within a foot of the surface of the beds. In trenching the beds he throws the sides to the middle, and the middle to the sides, that there may be an equal mixture of the old tan. Thus they are rendered of a mild and equal temperature from the first, and continue much the same for three or four months; and, after the first filling, are attended with very little expense for new tan. It is obvious, therefore, that, in filling the pit of a new pinery, it should either be done several months before the plants are placed in it, or the tan should be well sweated and wasted by previous turning, in an open shed, &c. And in either case it is advisable not to plunge the pots above half their depth, for the first two or three months after filling.

In adding new tan, it should invariably be thrown up in a heap for eight or ten days before using, in order to drip and sweeten; and should never be applied fresh from the tan-yard; as it is wet, and apt to heat violently, as well as cake in the beds.

It is remarked that some object to tan as being expensive, and troublesome in working with: but, if this method is practised, these will be inconsiderable; and, as the plants require frequent shifting, the trouble of stirring up the bark-beds at such times is but trifling, the addition of new tan being sometimes unnecessary.

He is convinced that there is no ingredient which can be substituted for tan, that will equally answer the purpose in the pinery; and of course recommends the use of it in preference to all others, where it can be easily procured; and less or more of it is always indispensably necessary. He considers oak leaves as the next best material; but they cannot be had in many places. Where they are used, he advises that at least eighteen inches of well-reduced tan be laid on the surface, to plunge the pots in.

After these, a mixture of stable-dung and tree leaves of any kind is supposed the best. This should be well fermented before it is used, and at least two feet of reduced tan laid on the surface for the reception of the plants.

It is supposed by some that the reason of pines being planted in pots, instead of the surface of the beds, is the want of permanent heat in them,

as they may be removed with more facility in the time of renewing the bark, &c. But Mr. Nicol has a different opinion of the matter, as, if the heat of the bed were ever so permanent, he would grow them in pots; as all the different plants of any kind do not grow alike in their native climates, much less the pine in an artificial one. There is a necessity for having at least two compartments, and of growing the plants in pots; that they may be removed and classed, according to circumstances, with the greater ease and safety. Besides, many sorts of plants in any situation do much better in pots than otherwise; of these are all those of the succulent tribe, amongst which is the pine.

There would also seem another reason, which is the loose incoherent nature of tan, not affording a proper medium for the growth and support of such luxuriant plants.

The usual periods of forming and renovating or refreshing these beds, are in the beginning of the autumn, as in September, October, or the following month, that the heat may be well kept up during the winter, and in the spring, as about the beginning of April, a forking up being given in the interval between these periods; the pits in these cases being constantly well filled up, to allow for the settling that always takes place.

Mould proper for Potting the Plants.—The most suitable sort of earthy material for the culture of the Pine Apple plant in, is that of the pure vegetable kind, or some composition in which it is a principal ingredient, a large proportion of which should always be provided in a proper state for the purpose. The most beneficial kind is that which is obtained from the decayed leaves of the oak, or a mixture of it with that from those of ash, elm, beech, sycamore, &c. This mould is prepared by collecting the leaves as they fall in the autumn, and placing them in a heap, throwing a very little light mould over them to prevent their blowing away. They should remain in this state during the winter, and till the beginning of May, when they should be turned over and mixed well together. In this way, by the spring following, they will be reduced into a mould proper for use. This should however be sifted before it is employed, in order to remove pieces of sticks or other improper matters.

A compost of turfy vegetable mould with rich garden soil, and well rotted stable-dung from a hot-bed, in the proportion of one third of the latter, which has remained together for a considerable length of time, is likewise recommended by some.

Brown strong loamy earth well reduced by

long exposure to the weather is another useful material; pigeon-dung that has been at least two years in a heap, and frequently turned and exposed to the influence of the weather, may also be employed. Also shell marle; and sea or river gravel, which has been sifted and kept in a dry place, having the size of large peas.

The proportions in which they are advised to be made use of for different purposes in the culture of these plants, by Mr. Nicol, are these; for crowns and suckers, entire vegetable mould, with a little gravel at bottom, to strike in; afterwards three fourths vegetable mould, one fourth loam, mixed with about a twentieth part gravel, and a little entire gravel at bottom, till a year old. For year olds, and till shifted into fruiting pots,—one half vegetable mould, one half loam; to which should be added about a twentieth part gravel, and as much shell marle, with a little gravel at bottom, as above. For fruiting in, one half loam, a fourth vegetable mould, a fourth pigeon-dung, to which should be added gravel and marle as above, laying two inches of entire gravel at bottom.

Raising the Plants.—This is the next point of consequence in the cultivation of this fruit; and which is effected by the crowns produced on the tops of the fruit, the off-sets or suckers from between the leaves, and the roots of the old plants. The last should never be employed where it can be avoided. Of the other two, suckers are preferred by some, while crowns have the advantage according to others; but Mr. Nicol justly remarks, that if the former have the superiority in being the stronger plants, they have likewise the disadvantage of running to fruit more unseasonably than the latter.

The crowns are procured by twisting them from off the fruit when it is made use of; and the suckers by breaking down the leaf immediately beneath them, and moving them gently both ways till they come off; which should not be attempted till the under parts appear of a brown colour, and ripe, as under other circumstances they are liable to break in the middle and be spoiled. When taken off, they should each of them be cleared of a few of the lower outward leaves about the bottoms, where they are to form roots, by rubbing them off, and some pare the under part of the stumps smooth with a knife. They are then laid or hung up in a dry place four or five days, or more, that the over moisture and wounds in the stumps or thick parts of the plants may be dried up sufficiently and healed over before they are planted, and the danger of their rotting be prevented.

The author of the *Scotch Forcing Gardener*, however, observes, that if they are perfectly ripe,

and the old plants have not had any water for a week or two before they were taken off (which they ought not), nothing of this kind is necessary. Each plant frequently affords many suckers, but rarely more than one crown. The crowns are usually gathered one by one, as the fruit is used, and stuck into the bark-beds till the whole crop of them, as well as suckers, can be potted together.

The plants, after being thus prepared and collected, must be placed, according to their sizes, singly in pots of three or four inches diameter, and five or six deep, provided for the purpose, and filled with entire vegetable mould, as above, having the bottoms previously laid with clean gravel, of the size of horse-beans, to the thickness of an inch or something more. Some, however, only advise a piece of shell or tile to be put over the hole. The first is probably the best method, as preventing the water the most effectually from stagnating about the roots of the plants. In planting they should neither be put in too shallow or to too great a depth, but have the mould pretty closely pressed round them.

The nursing-pit should be prepared for their reception, by having new tan, to the extent of a fifth or sixth part added, but none suffered to lie within ten or twelve inches of the surface. In these beds, when of a due heat, the pots should be plunged quite to the brims, in regular order, at the distance of two or three inches pot from pot each way, keeping them perfectly level, and the largest towards the back parts. Some advise a slight watering to be immediately given; but others think that neither the crowns nor suckers should have any for the first fortnight after planting, nor any over head the first winter, lest they should be injured in their hearts by the damp which it occasions.

As the plants thus raised only produce fruit once, as in the second, or more generally in the third year's growth, commonly with suckers and crowns for future increase, and become afterwards of no use but as stools for supplying a few more suckers, there is obviously a necessity for raising fresh supplies of plants annually.

Culture in the Nursing-stoves.—The management of the plants, the first year, or while they remain in the nursery-stoves or pits, requires much attention to keep them in a regular and healthy growth, by preserving a continued proper degree of heat in the beds, and a judicious application of water, with a suitable admission of free air. Mr. Nicol observes, that when the plants have been struck in the beginning of September, the beds will mostly continue of a kindly heat till about the middle of November;

but should then be wrought over, introducing about an eighth part of new tan by trenching it in. But though the plants will in general have made good roots by this period, they do not in common stand in need of being fresh potted; such only as are in any degree matted in the roots, being put into other pots of the next size to those in which they are growing. The matted part being simply taken off, they should be replaced with the balls as entire as possible.

They are then to be plunged in the beds, as in the former case, quite up to the brims of the pots, and should remain till the beginning of March; at which period the beds should be again wrought over as directed above, and the plants have the mould wholly shaken from their roots; after which they should be replaced in the same pots with fresh mould, and replunged in the beds. In this case the roots, being fresh, should not be disturbed; the parts that are decayed in the stumps or other places only being removed.

As the heat of the beds without the aid of fire will not be sufficient during these periods for the healthy growth of the plants, it will be requisite to have recourse to that of the artificial kind. This should be applied about the beginning of October, or the following month, according to the state of the season. In the application of this heat, great care should be had to keep it so moderate as not to force the plants forward too much, and render them in danger of fruiting unseasonably, while it is sufficient for their perfect growth. The former is shown by their drawing up with long leaves and white hearts, and the latter by the want of the proper healthy aspect. To accomplish this in the most certain manner, Mr. Nicol recommends working the stoves so as to keep the thermometer as near as possible to 65°, at seven or eight o'clock in the morning, and nine at night, until about the first of March, and then to increase it gradually to 70°; at which it should be maintained so long as artificial heat may be required.

When the weather is very severe it is likewise necessary to cover and defend the glasses in the night-time, as well as occasionally in the day, with canvass for the purpose, or cloths fixed with rollers and pulleys, or large garden mats.

At the above period the plants usually begin to grow in a vigorous and rapid manner, and require potting again about the first or middle of May; at which time the bed should be stirred up to about half its depth, and, if necessary, a very little new tan worked in. The plants should now be put into pots of about six inches in diameter on the inside at the tops on a

medium, according to their sizes, with the balls entire; and if any of them are matted, that part should be displaced; plunging them to the brim, at the distance of about fifteen inches from centre to centre of the plants in the largest kinds, and a foot in the smaller ones, giving a slight watering at the time.

Another potting becomes necessary about the beginning of August; and where there are three compartments, the plants should now be removed into the succession-house, the bark-bed being worked to the bottom. The plants must be put into pots of eight inches diameter, plunging them to the brims at the distance of sixteen inches on a medium, settling them with a gentle watering.

At these periods a more free admission of fresh air becomes necessary, especially when the weather is mild and favourable.

Where succession-stoves are employed in the culture of these plants, they are capable of being much more conveniently managed in their growth the second year.

Culture in the Succession-Stoves or Pits.—In the second year's growth of these plants, it will be necessary, towards the middle of November, to work the bark-beds over to last during the winter, but the plants need not be shifted; the decayed leaves about their bottoms being only twisted off, and a little fresh mould laid on the surface of the pots, when it may be requisite, replunging them to the brims as before. Some advise the leaves of the plants to be tied up while they are potting or removing, in order to keep them from being bruised; but Mr. Nicol disapproves of the practice, as he finds they are generally much more bruised in the tying than when left loose. His method is, to have a person standing opposite him in the time of potting, which is performed on a stage about a yard high, whose business is to hold up the leaves in a loose though regular manner between the arms, and prepare and hand the pots, while another hands and sets aside the plants. In this manner he has often been able to shift a hundred one-year old plants in two hours. In conveying the plants through the doors of the stoves, the person should proceed with the back foremost, by which the leaves are saved from injury, as the pot goes first, and the leaves are drawn backwards after it.

About the beginning of March, the plants again require shifting, and the bark-beds should then be trenched as before. The plants at this time must be shaken out, and replaced in the same pots, in entire new mould, cutting off any decayed roots, or the ends of the stumps, and twisting off a few of the bottom leaves, &c. re-

plunging them as before in the beds, and giving them a slight watering.

Towards the first of June the plants should be shifted again; the bark-beds being wrought over to about half their depths, and a little fresh tan added when necessary; the plants, with their balls entire, being then placed into pots of about ten inches diameter, plunging them at the distance of eighteen inches from centre to centre into the beds, and with a little water settling them.

In regard to potting, Mr. Nicol remarks, that at all times a few of the bottom leaves should be twisted off each plant, that fresh roots may be made more readily to furnish the surface, which tends to keep them more steady in the pots.

The fire-heat in these cases should be begun about the same period as before, according to Mr. Nicol, and kept to about 60 degrees of the thermometer till the beginning of March, and then gradually increased to 65° for the remainder of the season.

The plants should be refreshed occasionally with a little water, according as the earth in the pots becomes dry, or as the state of the weather demands. They should likewise have a more free admission of fresh air whenever the season will admit of it without danger.

Culture in the Fruiting-Stove or Hot-house.—The plants raised in the nursery-pits, and continued in their growth in the succession-stoves, having attained a proper size and strength, should, towards the latter end of August, or the beginning of the following month, be placed in the pots in which they are to fruit in the same manner as before, and deposited in the stoves of the hot-house, which should have the bark-beds prepared for their reception, by trenching them to the bottom, and adding about a tenth part of new tan in a proper state of preparation for the purpose, being well blended, and made so as to fill up the pits well.

The pots in which the plants are now put should be about a foot in diameter, which should be plunged in the beds to the brims; a gentle watering being immediately given. In potting the plants, Mr. Nicol, in these cases, advises the use of a small stick to trundle the mould down between the balls and the sides of the pots, so as to leave no cavities; a circumstance which should be attended to at all times, as being of great utility.

The management in this state differs but little from that of the preceding: the chief circumstance is that of keeping up the heat in as regular a manner as possible, with the addition of a due degree of refreshing moisture and free air.

The beds should, about the middle of November, be stirred to half their depths, and a little tan be added; but the plants must not be shifted at this period; they only require to be replunged to the brims again in the beds for the winter. It is the common practice at this time, to add a large quantity of new tan, in order to keep up a strong bottom heat through this season; than which, Mr. Nicol thinks, nothing can be more erroneous. He has already remarked that the bottom and superficial heat ought to correspond at all times; and if the house is to be wrought to 60° only for the winter, it follows, he supposes, that a very moderate bottom heat is sufficient. The temperature of the house being so much reduced in winter is, he conceives, to prevent the plants from starting too soon into fruit; and their doing so is frequently more in consequence of too much bottom heat, than irregularity in the temperature of the stove.

In the beginning of February, which is the best showing season, the bark-beds will require trenching; which is the only time of the year that Mr. Nicol advises a deviation from the rules given above. From this time, the house in his opinion should be wrought as high as 70°, and the bottom heat keep regular pace with the superficial; for which new tan to the extent of a sixth part should be added. Such of the plants, he observes, as are not *shown*, are healthy at the root, and stand erect and firm in the pots, should have a little fresh mould laid on the surface, by the removal of about two inches of the old. But those that are already shown, and those that are anywise unhealthy, or appear stunted, should be shaken out entirely, and replaced with fresh mould in the same pots; but none of the roots, unless wasted, should be cut away or removed. This, so far as it respects the plants that are shown, he presumes has not hitherto been recommended; he is consequently happy in being enabled to do it with confidence, as it has ever been a matter to be regretted, that pines, from the want of sun and air in the winter months, are apt to be stunted, and show their fruit too soon; and that fruit so shown, seldom comes to be of any considerable size or flavour; the plants so stunted being unable to nourish the fruit; and this, from the want of sunshine in the early months, coming far short in flavour to that matured at a later period.

It is added that the experiment was tried on a dozen of plants; the half of which were in, and the other half past the flower, at this time of the year. The result was, that they were kept back a full month by the operation; those that were past the flower equalled, and those

that were only in flower considerably exceeded, any of the others of their own forwardness at the time of shifting. Being encouraged by this success, the author treated his whole stock of fruiting plants in the same manner the following season, and they were kept back to a better season, and swelled their fruit to as good a size as those that showed in February.

Towards the beginning or middle of May, the bark-beds should be again trenched to the bottom, a tenth part of new tan added, and the plants replunged in the beds in the same manner as in the preceding cases, nothing further being necessary.

Though it is not possible to apply the heat constantly with that degree of exactness that has been recommended, it is of great importance to approach it as much as can be conveniently done; which, by proper attention to the thermometers employed for the purpose, may in a great measure be accomplished, especially where the person who manages the fires has likewise the command of the house, which should always be the case.

Several sorts of fuel are employed; but coal or coal cinders make the most regular and durable fires, where they can be obtained. Ground peat and turf may also be employed where the fire-places are properly constructed for the purpose. See HOTHOUSE.

In order to preserve a due temperature when the winter season proves very severe, occasional coverings may be necessary to be applied over the glass frames of the houses in the manner that has been already recommended.

With regard to the admission of air, the author of the Scotch Forcing Gardener recommends very large portions to the fruiting-house while the fruit is ripening; it is, as he thinks, not only essential to the flavouring of it, but highly conducive to the ripening and hardening of the suckers, which is also a point of importance.

It is advised that in winter, even frosty air should be admitted in a moderate degree at the top of the house; and in fresh weather, at this season, to the extent that the thermometer may not be more than 5 degrees above the fire heat medium, being continued till the middle of March; after which, and for the whole season, not more than 10 degrees. It is observed that in winter fires are frequently made in the morning, solely for the purpose of admitting air, and at the same time keeping up the temperature of the house; and that "although the pine from its nature does not appear to quickly feel the effects of bad management, there are few plants in reality do it more so; and too due

an attention to the temperature of the house, especially in winter, cannot be paid, the want of which is sure to throw the plants into fruit at an untimely season."

Though it is the practice of some to shade their plants from the sun, the above author supposes they can never have too much of its influence.

In respect to the application of water in the culture of these plants, it is advised to be given very sparingly in dull weather, particularly in the winter season. From about the beginning of October to the first or middle of March, once in eight or ten days is generally sufficient, in a small proportion; but from March to October, plentiful waterings are requisite in considerable quantities at a time, mostly once in three or four days. Watering much over head in winter is not advised, except in clear weather. But, in the summer months it is recommended as a good practice, to first give the quantity requisite to the root, from the spout of the watering-pan; and then a sufficient quantity to wet every part of the leaves from the rose. The reason of which is, that different kinds of pines are found to require very different quantities of water: "the Queen requiring a third more than the King, Antigua, or Brown Sugar Loaf; and the Montserrat and Green or Striped Sugar Loaf, a medium between the two," with "plants in an equal state of health and size."

With the fruiting plants, very large quantities are required from the time they are out of flower till they begin to colour; but which should then be gradually withheld, and, towards their maturity, totally; as this increases the flavour of the fruit, and perfects the ripening of the suckers.

Soft water well impregnated with air should be used at all times, which should be applied either about eight o'clock in the morning, or from four to five in the afternoon.

Steaming is considered by Mr. Nicol as not only useless to the health of the pine, but in hazy, dull weather in winter prejudicial; of course, when there are grapes in the stove, it should be regulated so as to suit them.

In the watering of these plants, a tin pipe is recommended as useful and convenient, for the more ready conducting the water, in the quantity intended, to any particular plant in any part of the bark-beds. It should be about six feet long, an inch and half in diameter at the upper end, and at the other about half an inch, and be formed of two or three separate pieces, to lengthen or shorten at pleasure: at the largest end, a kind of funnel should either be fixed, or so contrived as to take off and on

occasionally, to receive the water from the watering-pot. By this means water is capable of being conveyed to the plants separately in any proportion without any being poured into the hearts of them, and without wetting the bark-beds more than is necessary to moisten the earth in the pots, &c. It is particularly applicable in winter, as well as in the spring, during the bloom of the fruiting plants.

In winter it may sometimes be proper to have some convenience in the stove to preserve water in, that it may be raised in its heat a little, previous to watering the plants with it.

The application of steam has lately been attempted in the raising of this sort of fruit, and, from the trials of Mr. Bastard, with considerable success; as, from his statements detailed in the 67th vol. of the Philosophical Transactions, it would seem that both the size and flavour of the fruit were greatly increased by placing the plants in their pots in shallow pans kept constantly filled with water on shelves, so as nearly to touch the glass on the back side of the hothouse, where the heat is constantly the greatest. The same effects have likewise been produced by setting them in leaden cisterns placed over the back flues of hothouses. It is, however, remarked by the author of the Philosophy of Gardening, that the use of the steam of boiling water in this way requires much attention. It is usually conveyed through small apertures which pass through a brick arch, somewhat in the manner of the floor of the malt-kiln, where the water boils beneath the beds of bark, being occasionally admitted into the room above, supplying in this way heat and moisture to the beds as well as the air of the house. See *STREAM* and *HOTHOUSE*.

Some have attempted the culture of the pineapple without the assistance of hot-houses and stoves constructed for the purpose, simply by means of common deep garden frames, and dung hot-beds aided by occasional linings, in order to promote and keep up a regular degree of heat; but this is a very imperfect method, and seldom attended with much success.

The injuries which these plants are exposed to during their growth, are chiefly from brown and white scaly insects of the *coccus* tribe, and the ant. But, as the last is seldom seen if the former are not present, Mr. Nicol concludes that their presence is in consequence of that of the *coccus*, on which they seem to feed. And the brown scaled insect is conceived to be no further injurious to the plants, than by dirtying them. But the *white scaled*, or *bug*, is of the most mischievous nature to the plants, as where it abounds they never succeed well.

In order to remove them, Mr. Nicol found the

following method answer perfectly in a case where the plants were greatly affected. Having prepared a strong heat for the plants in the bark-bed of the nursing-pit, he shook the plants out of the pots, and cut every fibre from their roots, (whereby they were rendered the same as suckers at first,) not excepting those that were in fruit, some of which were just in flower; dipped them into a liquor, prepared by boiling two pounds of soft soap and flowers of sulphur, with one pound of roll tobacco, and two ounces of nux vomica, in eight gallons of water to six, and then put them into pots of six inches diameter, and plunged them to the brim, keeping up a fire heat to about 75 degrees; gave them but little air, shading them in sunshine; and afterwards afforded them plentiful waterings over head, with the same mixture reduced to about half its former strength. He continued this treatment for two whole months; at the end of which he again shook out their roots, and washed the whole plants in pure water; put them into fresh pots of eight inches diameter, and re-plunged them into a kindly heat in another nursing pit, treating them in all respects as any other plants. He never saw a vestige of the bug afterwards. A few of those plants that were *shown*, however, died; but the others, he observes, produced such fruit as might be expected from plants of such sizes of any other kind.

Time of Maturation and Cutting the Fruit.—The common season for the ripening of this sort of fruit is from June till September, but from August to the end of the latter of these months is the principal period of their becoming in the greatest perfection. Mr. Nicol remarks that the plants in some kinds put forth suckers at the base of the fruit; which should be rubbed off as they appear. Others put forth suckers from the root; and, as these are not proper to be taken into the stock, they should also be twisted off, or otherwise destroyed, as they appear. It is added, that if a plant were to be divested of all its suckers, the fruit would grow to a much larger size in consequence; but, as this would ultimately tend to the extirpation of the whole stock, it is by no means advisable. It is proper, however, to reduce the number of suckers on the plant to two or three at most, which should be done in the May shifting; and as the suckers are about half grown at that time, the cultivator is enabled to choose the best, and at the same time to easily destroy the others by breaking out their hearts. Where the increase of the stock is the object, all suckers, even of the roots, should be encouraged in their growth.

As some of the kinds also grow on long foot-stalks, which are apt to bend down as the fruit gets heavy, they should be supported by small stakes, or other means, as, when the fruit falls over, the stalks are liable to be bruised, and the nourishment of the fruit retarded.

This sort of fruit loses much of its flavour when suffered to grow till fully ripe, where not prevented: it should therefore always be cut by the time it has attained a greenish-yellow colour; and either left in the heart of the old plant, or laid on the wall plate, &c. in the stove, for a few days after it has been separated from the stem.

The signs of the fruit having attained perfection, in most of the kinds, are, those of its assuming a fine golden colour with a delightfully fragrant smell, at which time it should always be removed; the method of performing which is, by leaving several inches of the stem with it, and all the crown of leaves at the top. It is eaten in the most perfection soon after being cut; but, when requisite, may be preserved in good order for several weeks, by putting the stem into a bottle of pure water, renewed every two or three days, and placing it in a well-aired room, at about 60 degrees of heat.

The culture in the other species may be effected either by sowing the seeds obtained from abroad in the autumn or spring months, in pots plunged in the hot-beds of the stove, or by means of suckers in the manner of the pineapple.

They should be kept constantly in the stove, where they afford much variety.

BROOM. See *GENISTA*.

BROOM, African. See *ASPALATHUS*.

BROOM, Garden, a collection of the small twigs or other parts of birch, broom, heath, or other similar trees or plants, bound up tight together, having a stem or handle introduced in the middle. The best sort for this use are those formed of birch, which should neither be too stiff nor too large. Brooms are constantly in use, especially during the spring, summer, and autumnal seasons, for keeping walks, plats of short or mown grass, and other parts of ornamented grounds, perfectly clean. Those intended for sweeping up cut grass or leaves should be more slender and less bulky than such as are employed on gravel or other walks. In all cases the materials should be fresh, and very firmly tied up together.

BROWALLIA, a genus comprising plants of the tender annual stove-kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Luridæ*.

The characters of which are: that the calyx is a one-leaved, tubular, short, five-toothed, permanent perianthium: the toothlets a little unequal: the corolla is monopetalous, funnel-form: the tube cylindric, twice as long as the calyx: the border flat, equal, and five-cleft: the divisions rounded and emarginate; the upper somewhat large, constituting the upper lip; the four others equal: the stamina consist of four filaments in the throat of the corolla; the two upper shortest; the lower broader and higher, coloured, reflex, closing the throat of the corolla: the anthers are simple, bent in, and converging; the inner ones twin, the outer opening at the top with a little hole, and closing the throat of the corolla: the pistillum an ovate retuse germ: the style filiform, the length of the tube of the corolla: the stigma is thick and four-lobed: the pericarpium is an ovate, obtuse, one-celled capsule, covered, bursting into four parts at the top: the partition thin and parallel: the seeds numerous and small: the receptacle nearly columnar and compressed.

The species are, 1. *B. demissa*, Spreading Browallia; 2. *B. elata*, Upright Browallia.

The first usually grows about two feet high, and spreads out into lateral branches, with oval entire leaves, ending in a point, and on short petioles. Towards the end of the branches the flowers are produced singly upon long axillary peduncles. The corolla is crooked and bent downward; the top of the tube is spread open, and the brim has some resemblance to a labiate flower. It is of a bright but pale-blue colour, sometimes inclining to a purple or red; and often there are flowers of three colours on the same plant.

The second species rises about the same height as the first, but has stronger stalks, and sends out a greater number of branches; it is therefore much more bushy. The flowers are produced on axillary peduncles, some sustaining one, others three or more flowers, of a dark-blue colour. But, according to Mr. Curtis, it is a much taller plant than the above, and justice cannot be done to the brilliancy of the corolla by any colours we have. It is a native of Peru, and flowers from July to September.

Culture.—These plants may be raised annually by sowing the seeds on a moderate hot-bed, in the spring season; and when the plants are of sufficient growth they may be removed into separate pots, filled with good mould, and plunged in the stove, water being occasionally given. They flower the most part of the summer, and afford ripe seed.

They are very ornamental plants, especially

the latter species, and afford variety in the green-house.

BRUNIA, a genus containing a plant of the shrubby exotic kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are : that the calyx is a common, roundish, imbricate, many-flowered perianthium: the leaflets ovate-oblong. Proper five-leaved, inferior: leaflets oblong, and villose: the corolla consists of five petals: claws slender: borders roundish, and spreading: the stamina consist of five capillary filaments, inserted into the claws of the petals: the anthers are ovate-oblong: the pistillum is a very small, superior germ: the style simple and cylindric: the stigma obtuse: there is no pericarpium: the seeds solitary: the receptacle common and hairy.

The species is the *B. lanuginosa*, Heath-leaved Brunia.

It has the stem rising about a foot in height and shrubby. The leaves are linear-filiform, smooth and short, with black tips. The flowers are white, and produced in heads. It is a native of the Cape.

Culture.—It may be increased by cuttings or slips made from the young branches or shoots, which should be planted out in pots of rich earth, and plunged in a hot-bed, a little water being frequently given. After the plants have stricken good root, they should be removed into separate pots to undergo the ordinary culture of other green-house plants.

BRUNSFELSIA, a genus comprehending a plant of the shrubby exotic sort.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved, bell-shaped, five-toothed, very obtuse, small, permanent perianthium: the corolla is one-petalled, funnel-form: the tube very long, slightly curved inwards: the border is flat, five-cleft and blunt: the stamina consist of four very short filaments: the anthers are oblong and upright; two a little higher than the others, prominent from the mouth of the tube: the pistillum is a roundish small germ, the style filiform, the length of the tube: the stigma is thickish: the pericarpium is a capsule, berried on the outside, globular, one-celled, two-valved: the seeds are very many, compressed, convex on one side, angular on the other, rugged with dots: the receptacle is fastened to the bottom of the capsule, chaffy: the chaffs coadunate, subulate at the tip, separating the seeds.

The species is the *B. Americana*, American Brunfelsia.

It rises to the height of from five or six to eight, ten, or more feet, with a smooth even trunk and loose branches: the leaves are alternate, entire, smooth, somewhat shining; on cylindric, short petioles, somewhat reflex: the flowers axillary and terminating, peduncled, produced three or four together: the corolla yellow, turning white, very sweet-scented, having a tube four or five inches in length: the anthers are globular, and bifid: those of the upper filaments, together with the stigma, close up the aperture of the tube: the fruit is green, with a red conceptacle. It is a native of Jamaica, and known by the title of Trumpet Flower.

Culture.—These plants are capable of being increased, either by seeds or cuttings, which should be sown or set in pots of fresh light earth in the spring, and plunged in the bark hot-bed, watering them as may be necessary. When the plants have attained sufficient growth, they should be removed into other pots of the same earth, and replaced in the hot-bed, water and shade being given till they become well rooted, when free air should be admitted. In their more advanced growth, they may be removed into the bark-stove, and have free air during summer, but should be well protected in the winter. These plants afford variety in the stove.

BUBON, a genus containing plants of the shrubby tender kind for the green-house.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

Its characters are: that the calyx is an universal umbel, of about ten rays, the middle ones shorter: partial of fifteen to twenty rays: involucre universal, five-leaved: the leaflets lanceolate-acuminate, patulous, equal, much shorter than the umbel, and permanent: partial with rather more leaflets, of the same shape, the length of the umbellule: the perianth proper five-toothed, very small and permanent: the corolla universal uniform: all the floscules fertile. Proper of five, lanceolate, inflex petals: the stamina consist of five simple filaments, the length of the corollule: the anthers are simple: the pistillum is an ovate, inferior germ: the styles two, setaceous, permanent, hardly the length of the corollule, spreading and reflex: the stigmas are obtuse: no pericarpium: the fruit ovate, striated, villose, bipartite, and crowned: the seeds two, ovate, flat on one side and convex on the other, striated and villose.

The species cultivated are; 1. *B. Galbanum*, Lovage-leaved Shrubby Bubon. 2. *B. gumiferum*, Gum-bearing Shrubby Bubon.

The first species rises with an upright stalk to the height of eight or ten feet, which at bottom is ligneous, having a purplish bark, covered with a whitish powder, which comes off when handled; the upper part of the stalk is garnished with leaves at every joint, the foot-stalks half embracing them at their base, branching out into several smaller, like those of the common parsley, and set with leaves like those of lovage, but smaller, of a gray colour; the top of the stalk is terminated by an umbel of yellow flowers, which are succeeded by oblong channelled seeds, having a thin membrane or wing on their border. It flowers in August, but does not produce seeds in this climate. When any part of the plant is wounded, there issues a little thin cream-coloured milk, which is the drug galbanum. It is a native of the Cape.

The second rises with a woody stalk about two feet high, with leaves at each joint branching out like those of the former; but the leaflets are narrow and indented, like those of bastard hemlock. The stalk is terminated by a large umbel of small white flowers, which are succeeded by seeds as in the former sort. It is a native of the Cape, and flowers in July.

Culture.—These plants are propagated by seeds, which should be sown in pots filled with light loamy earth, as soon as they are procured, which if in autumn, they should be plunged into a bed of tanner's bark, where the heat is nearly gone, and be screened from frost in winter. The plants come up in the spring, and about the middle of April are fit to remove, when they should be carefully shaken out of the pots, and be planted each into a separate small pot, filled with the same sort of earth, then plunged into the tan again, water being given to settle the earth to the roots, as well as shade in the daytime, until they have taken new root. They must then be gradually inured to the open air, into which they should be removed in June, being placed in sheltered situations where they may remain till autumn, when they must be taken into the green-house, and be exposed to the sun and air as much as possible, but defended from frost.

In winter they should have but little water, as much wet injures them; but in summer, when exposed to the open air, they must be frequently refreshed with water in dry weather.

These plants afford variety in the green-house in winter, and, when placed out in summer with other green-house plants, have a good effect, especially when grown to a good size. They mostly flower the third year from seeds, but their flowers are produced so late in summer, that the seeds seldom form before the cold

comes on: in warm summers, however, the second sort will perfect seeds, if it stand in a warm sheltered situation.

BUCKNERA, a genus containing a plant of the exotic shrubby kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personateæ*.

Its characters are: that it is a one-leaved, obscurely five-toothed, scabrous, permanent perianthium: the corolla is monopetalous: tube very long, filiform, bowed, border flat, short, five-cleft, equal: the two upper divisions very short, reflex; the three lower cordate, nearly equal: the stamina consist of four filaments, very short, in the throat of the corolla; the two upper ones prominent outward, and short: the anthers are oblong and obtuse: the pistillum is an ovate-oblong germ: the style filiform, the length of the tube: the stigma obtuse: the pericarpium is an acuminate capsule, covered, two-celled, gaping at the top into two parts: partition contrary: the seeds are numerous and angular: the receptacle is fastened to the middle of the partition.

There is only one species for our use, *B. viscosa*, Clammy Bucknera.

It rises with a shrubby upright branching stalk, with slightly indented, linear, spear-shaped leaves. The flowers are purple with a yellow eye. It has not much beauty, but occupies little room, and flowers during most of the summer months. It was found at the Cape.

Culture.—This plant may be readily increased by setting cuttings from the young shoots in summer, in pots of light mould, care being taken to water and shade them well till they have stricken roots, and become well established; when they should be removed into other pots separately, and be protected during the winter season in the green-house.

BUD, the eye or spot whence a branch is sent off in trees or plants. It is the *hybernaculum* or winter-cradle of the embryon shoot, being mostly covered by scaly laminae, and sometimes a resinous varnish, that serves to protect it during the winter from the effects of cold and moisture, as well as the attacks of insects. They are either leaf-buds or flower-buds, or both in the same covering. These embryons have been denominated the "viviparous progeny of plants," by Doctor Darwin, in contradistinction to those from seeds, which he has termed "oviparous progeny."

The bud, according to Doctor Hooper, at first lies concealed in the body of the tree or branch between the barks, being very small, and covered with the bark in the same way as

the seed. It afterwards sends out small delicate vessels that inscuscate with those of the trunk, and absorb from them the sap-juice which is conveyed to every part for its nutrition. And after having attained a determinate size in this situation, it penetrates and forces itself through the coverings into the air, which at first are pushed before it so as to swell out, and soon afterwards torn asunder; when it unfolds itself, exhibiting in a short time the perfect plant in miniature, but deriving its nourishment from the tree, till forced or cut off, and planted in the soil. Buds, by being inserted into or ingrafted on the stems or branches of other trees, or by being planted in the earth, become plants similar to those from which they were taken.

Each bud of most of the deciduous trees in this climate, may, it is supposed by the author of the *Philosophy of Gardening*, be considered as an individual biennial plant, with as much distinctness as a seed; as "the bud like the seed is formed in one summer, grows to maturity in the next, and then dies." Yet that in some trees in this climate, such "as the mock orange, philadelphus, acacia, viburnum; and in the evergreen shrubs, such as holly, laurel, vinca, heath and rue," as well as "in all those herbs commonly called annuals; and in most of the trees of warmer climates, the buds appear to be formed in the vernal months, and to arrive at their maturity during the same year, and may therefore be properly called annual plants." It is likewise further contended, that "the bud of those herbs usually termed annuals, rises in the bosom of a leaf; and, as it adheres to its parent, requires no female apparatus to nourish it, but gradually strikes down roots from its caudex into the ground, which caudex forms a part of the bark of the increasing plant." This is supposed to be exemplified in those herbaceous vegetables that have just risen from seeds; the buds of which being in reality individual annual plants, that "grow to maturity adhering to the parent," and do not consequently, from there being no reservoir of nutriment laid up for them, resemble a seed or egg: the same thing is also supposed to happen to the evergreen shrubs and trees of this climate, such as heath, rue, box, pine, and laurel, as in these vegetables, from the leaf not being destroyed in the autumn, it continues to oxygenate the juice, and supply nourishment to the bud in its bosom in the fine days in the winter and spring seasons, surviving till nearly the middle of summer, or when the new bud has expanded a leaf of its own. Hence it is ingeniously conjectured that such evergreens make no reserve of nutriment,

in the summer, in their roots or alburnum, for the support of their ensuing vernal buds, and consequently have perhaps no bleeding season, as in trees of the deciduous kind.

The embryo in a bud of a plant of the deciduous kind, however, leaves its hybernaculum in the spring season, in the same manner as the embryo in a seed, or the chick in the egg; and, as in these, the young plants in different vegetables have previously attained different states of maturity, as has been observed by M. Ferber in many instances.

But in the buds in many other trees, and in all the backward buds formed late in summer on the lower parts of branches much excluded from light and air, the embryo is not forward enough to be readily perceived; and in those deciduous trees or shrubs in this climate, that have no discernible buds in winter, such as the mock orange, viburnum, and various others, it is suspected that there is an embryo secreted from the juice of the plant at the foot-stalk of each leaf, but which is not so forward as to protrude through the bark and exhibit a prominent bud. The same is conceived to be the case with such trees in warm climates as lose their leaves in winter, in which they are believed not to produce buds in autumn, as it cannot be supposed how fresh leaf-buds can be produced in the vernal months, when the leaves or lungs of the full grown living part of the tree are destroyed, and the last year's buds along with them. But if the caudex of the new bud be generated without the plumula, or visible bud, it is certainly capable of affording a plumula for itself in the spring, as is exemplified in the production of new buds, or a branch being cut off, on the sides of the remaining trunk, as is often the case in trees of the willow kind.

In regard to the growth of the new bud, it is observed "that the pith is of great consequence to it, as is shown by gradually slicing a shoot of horse-chesnut in autumn or the early spring. The rudiments of the seven separate ribs of the late parent leaf, and the central pith of the bud in its bosom, are seen to arise or terminate near the pith of the parent shoot, where the embryo plumula is probably secreted by a gland at the bottom of the parent leaf-stalk, finds there its first reception and nourishment, and is gradually protruded and elongated by the pith which exists in its centre, as the bud proceeds, and thus constitutes the ascending caudex of the new bud; which is resembled by the wires of strawberries, and other creeping vegetables; whereas the descending caudexes of the new buds, which form the filaments of the bark of trees, are secreted from the various parts of the old

bark in their vicinity." The pith is therefore considered as the first or most essential rudiment of the new plant; like the brain or spinal marrow in animals.

In such plants as have hollow stems, the central cavities, though not filled with pith, are supposed to be lined with it; and in some this is not only the case, but, whenever a new-bud is formed on the summit of the ascending stem, or in the bosom of a leaf, a membrane covered with this substance divides the cavity, which distinguishes one bud from another. And in slicing away that part of the stem of others where the new lateral bud adheres, the pith in the centre of the bud is seen to commence near that membrane, which lines the stem, and to pass through the circle of different vessels that constitute the ascending caudex of the new bud, while the descending caudex of it is secreted in the manner just explained.

Thus the bud is at first nourished in the bosom of its parent leaf, by a secretion from the vegetable juice suited to the purpose, continuing to be supported in the same way in annual herbs and evergreen trees, till it protrudes and expands its own leaf; but if it be a bud of a plant of the deciduous kind, that must lose its parent leaf in winter, a reservoir of nutriment is prepared for it in the roots of some sorts of plants, such as carrots, turnips, liquorice, fern, &c., and perhaps in the roots and alburnum of trees. Hence, in the spring the vessels of each bud of a tree absorb moisture from the earth, and propel it upwards through the roots and sapwood, where it is blended with a nutritive material, often discharged from wounds in the bark. And at this period the buds begin to swell out, and to send roots downwards from their caudexes into the ground; the outer texture of these caudexes constituting a new bark over the old one, consisting of different sorts of vessels. At the same time each bud likewise puts forth a leaf, or respiratory organ, resembling in some manner the lungs of animals, but differing in this respect; that the leaf stands in need of light as well as air for the purpose of perfect respiration. The different embryos of the leaf-bud being in this manner provided with their adapted organs of respiration, and various new ones formed in the summer season in the different leaf-buds, they now begin to pullulate in succession, each as in the first having its appropriate leaf, which, as they come forward in order, constitute the annual sprigs or shoots of trees, being of considerable length in some, as the vine, willow, &c., having a great number of new leaves. Consequently, when the spring frosts or insects

destroy the first set of leaves, as often happens in particular sorts of plants, they are succeeded by a second set from the second embryos of the same bud. But when the floral leaves are destroyed, as happens in some cases to fruit-trees, the fruit in the pericarp is not destroyed as in the first embryo of the leaf-bud, as it is supported by the system of absorbing vessels of the caudex, and the roots of the flower-bud, which form a part of the bark and run into the earth; but is more sour, and less perfect, on account of the juices from which it is secreted being less perfectly oxygenated.

About the middle of the summer season there is mostly either a new leaf-bud or flower-bud formed in the axilla of each leaf; becoming a branch the succeeding year when a leaf-bud, and affording many other leaves and buds; but when a flower-bud, the growth stops, being terminated in the seed. In the more vigorous growth of the plant, leaf-buds are wholly or chiefly afforded; but in the more advanced state of growth, when the vessels of the bark are more fully elongated, and the nutritive fluids less abundantly provided, or the buds become in a more mature state, the production of flower-buds takes place.

On these grounds, Doctor Darwin has concluded that the grafts taken from vigorous seedling apple-trees do not bear fruit till they are many years old; while those cut from weak old trees bear abundantly in a very few. The same principle holds good in various other cases. It is concluded that the facility of forming the long caudexes of the new buds which constitute the new filaments of bark, promotes the increase of leaf-buds, and affords a vigorous luxuriant aspect to the trees; while the difficulty of producing these new caudexes increases the quantity of flower-buds, and lessens the vigorous appearance of them. It is likewise conjectured that the generation of buds demands a less perfect apparatus than that of seeds, as the former constantly precedes the latter, in trees as well as herbs. Hence the age of the plant is another circumstance of consequence to the production of flowers, fruit, and seeds, as is exemplified in tulips, hyacinths, as well as in the apple and pear tree.

It is believed by some, that the buds formed in the summer may be either converted into leaf- or flower-buds, according as the branch is more or less strong or vigorous in its growth, even after the vegetable embryos are formed. In proof of which, Dr. Darwin observes, that "if the upper part of a branch be cut away, the buds near the extremity of the remaining stem having a greater proportional supply of nutriment, and possessing a greater facility of

producing their new caudexes along the bark, will become leaf-buds, which might otherwise have been flower-buds; and on the contrary, if a vigorous branch of a wall tree, which was expected to bear only leaf-buds, be bent down to the horizon or lower, it will bear flower-buds with weaker leaf-buds." In explanation of this interesting fact, it is added, that both the flower-buds and leaf-buds perish in the autumn; but the latter as they advance afford other leaf-buds or flower-buds in the summer, in the axilla of the different leaves, which new buds require new caudexes extending down the bark, and in this way thicken as well as lengthen the branch; while the flower-buds shed their seed, and are afterwards destroyed in the autumn, not requiring any place on the bark for new caudexes. Of course, on the summit of a branch being cut off, the buds near the end of the stem that is left produce new leaf-buds with more facility, as there is more room for their new caudexes to be generated along the descending bark. But if a vigorous branch be bent down to the horizon or below it, the bark is compressed beneath the curve, and extended above it; and thus the production of new caudexes along the bark is impeded, and in consequence less leaf-buds and more flower-buds will be generated, or the former converted into the latter, which require no new caudexes. On this circumstance, it is conceived, the management of wall-fruit trees and espaliers in a great measure depends.

With the intention of converting leaf-buds into flower-buds, it has been suggested by some, that the more vigorous shoots, and even large roots, should be bound round with wire; and by others, that of cutting or scoring the bark round the body of the tree with a sharp knife in the manner of a screw. Others have produced flowers and fruit on standard and wall trees, by removing a cylinder of bark three or four inches in length, and replacing it by some sort of bandage. And a similar effect has been produced by a straight bandage put round a branch. It is supposed also, on the same principle, that from the pressure afforded by the callus of an ingrafted branch of a tree on the part, it bears better.

At the period when the new buds become evident in the bosom of each leaf, as about midsummer, it has been remarked that a sort of stand takes place in vegetation for a short time, which has been attempted to be explained in different ways. Doctor Darwin, however, suspects that at this period the reservoir of nourishment for the support of the new buds is forming about the roots or in the album of the tree, as well as the caudexes

down the bark and vessels destined to convey it to the new buds, which terminate in it.

On account of the roots of trees being protruded in a more vigorous manner at this than other periods, it has been preferred by Mr. Bradley, as the best adapted to the transplanting of trees when not removed to any great distance, as the new shoots in the ensuing spring will be sent forth with much greater force, and the tree of course be nearly a year forwarder in its growth, than if it be performed in the winter. This Doctor Darwin supposes to be owing to much of the nutritious material deposited in the roots for the support of the new buds, being destroyed in the operation, which is only capable of being restored at or about that period.

The first of these writers has advised, that in performing this business at the above period, none of the top, or branches, or foliage, should then be cut off. The propriety of this Doctor Darwin supports, by observing that, as it is from the vegetable juice oxygenated in its exposure to the air, "through the thin moist pellicle on the upper smooth surface of these leaves, that the nutriment for the expansion of the buds in the succeeding spring is secreted or produced," it follows that "if these leaves are prematurely destroyed, the vernal growth of the buds must receive injury, as the reservoir of future nutriment for them will be less in quantity: but if some of the branches are lopped during the winter, the remainder will protrude more vigorous shoots, as their share of the reserved nutriment will be greater." It is supposed that the vessels destined for the support of the new buds of deciduous trees, are analogous to those that permeate the lobes of the seed, being extended downwards in the bark towards midsummer, terminating in certain reservoirs of nutriment secreted at this time from the vegetable juice oxygenated in the leaves. This bark, it is observed by the above writer, "now consists of an intertexture of the caudexes of the present leaves, which were buds in the last summer, and are now adult vegetables; and of the embryo caudexes of the new buds, as well as of the vessels destined for conveying the support of the new buds: it will during the autumn or following spring become album, and by degrees be covered over with a new bark constituted of the mature caudexes of the new buds; whilst that which formed the album in the preceding "becomes a circle of lifeless timber, interior to the circle of album." It is likewise conceived that the vessels of this new bark, notwithstanding they are constituted "of the caudexes of the individual adult leaves, and

the vessels destined to convey the support of the individual young buds, obviously inoculate, as, when some buds chance to be rubbed off or destroyed, those near them grow in a more vigorous manner; which is constantly shown in the pruning of different sorts of trees.

It is further remarked, that the flower-buds of various trees proceed directly from the "last year's terminal shoots or spurs, either accompanied with leaf-buds, or separately, as in apple and pear trees." And that in "others flower-buds arise from the shoots of the present year alternately with leaf-buds, as those of vines, and form the third or fourth buds of the new shoots." These, it is added, "differ from leaf-buds in this circumstance, that they perish when their seeds are ripe, without producing any addition or increase to the tree; whereas, when the leaf-buds perish in the autumn, their caudexes, the intertexture of which constitutes the bark of the tree, gradually become converted into alburnum or sapwood; over which the new leaf-buds shoot forth their caudexes and radicles, or insert them into it, and gradually fabricate the new bark and root fibres."

On the whole it is concluded that "the central part of an adult bud consists first of a conjunction" of the vessels that convey the juice, "from above and below, which exists in the caudex of the bud between the beginning of the leaf-vessels, and the beginning of the root-vessels, the circulation resembling that in many insects and fishes. It is probable too, that at the same place there is also a conjunction of the absorbent vessels. Each bud is likewise furnished with an organ of reproduction, which in the leaf-buds produces the lateral progeny or offspring, and in the flower-bud the seminal. And still further provided with a centre of nervous influence existing in each bud, probably residing near the conjunction of the vessels of the leaf and root just noticed, and of the absorbent system, together with the organ of reproduction.

Besides these, various other interesting facts and observations are recorded by the author of the *Philosophy of Gardening*.

BUDDING, the art or operation of propagating and producing trees or plants by inserting an eye or bud of one tree into the bark of some part of the stem, stock, or branch of another of the same kind, by means of an incision, the head or top of the stock or branch being cut off some time afterwards. The bud thus introduced soon shoots forth, and in time becomes a tree or plant in all respects the same as that from which it was taken. The effect is

produced by a reciprocal inoculation of the wounded vessels of the different barks.

Almost all the more valuable and choice kinds of fruit-trees are increased in this way, as well as many shrubs and plants.

This is the only method by which the different approved varieties of many kinds of fruit- and other trees can with certainty be continued and multiplied; for, though their seeds readily grow and become trees, yet from the seeds or kernels of the finest varieties of fruit, not one tree out of a hundred produces any like the original, and but very few that are good; so variable are seedling fruit-trees, and many others: but the trees or stocks so raised being budded with the proper approved sorts, the buds produce invariably the same kind of tree, fruit, flowers, &c. continuing unalterably the same.

This mode of propagation is particularly useful for peaches, nectarines, apricots, plums, cherries, oranges, and jasmynes; the three first of which succeed better by budding than grafting, and are usually worked upon plum-stocks raised from seed, and sometimes by suckers, layers, and cuttings. They are also often budded upon their own stocks, as such as have been raised from the kernels of these kinds of fruit; but they are commonly more strong and durable when budded upon plum-stocks.

There are also other sorts, as plums and cherries, which are often propagated by budding as well as grafting: the cherry is, however, generally the most prosperous by the latter method, as being more apt to gum and go off by budding. These sorts, being of the same genus, grow well upon stocks of each other, but best upon their own stocks.

Apples and pears are likewise capable of being propagated by budding as well as by grafting; though, as they grow freely by grafting, which is the most easy and expeditious mode, they are commonly propagated in that way.

In short, most kinds of fruit-trees, and others, propagated by grafting, also succeed by budding. Grafting is, however, more adapted to some sorts, and budding to others.

Various sorts of forest and flowering trees, both deciduous and ever-greens, are also capable of being propagated by budding with a greater certainty of continuing particular varieties, than by other means, as many of the variegated-leaved kinds, the variegated hollies, &c.

The operation of budding, in all sorts, is mostly performed upon young trees raised from seed, suckers, layers, &c. which are termed stocks, and which, when about half an inch thick in the bottom of the stem, are of a proper

size for budding on, though it may be performed upon stocks from the size of a goose-quill, to an inch or more in size. It must be performed principally, as has been seen, upon stocks or trees of the same genus, as it is but few trees that will succeed upon stocks of different genera. Peaches and nectarines, however, grow freely upon plum-stocks, as being very nearly related, which are the most common stocks on which these sorts are usually budded. But in most other kinds of fruit- or other trees, the stocks of the same genus must be had recourse to, both for budding and grafting on.

Stocks are commonly raised from seed, as the kernels or stones of these sorts of fruit, &c. sown in autumn or spring, in beds in the nursery, an inch or two deep; which, when a year or two old, should be transplanted into the nursery-ground, in rows two feet asunder, and fifteen or eighteen inches distant in the rows; to stand for budding, keeping them to one stem, and suffering their tops to run up entire. Stocks are also often raised from suckers arising from the roots of the trees of their respective sorts; likewise by layers and cuttings of the several kinds. See *Stocks*.

The operation of budding may also be performed upon trees that already bear fruit, when intended to change the sorts, or have different sorts on the same tree, or to renew any particular branches of a tree, performing the work with the young shoots of the year, or of one or two years' growth.

The most suitable season for performing the operation of budding is from about the middle of July until the middle or latter end of the following month: some however begin to bud in June; but the buds inserted so early, are many of them apt to shoot the same year; and the shoots not having time to harden, are liable to be killed by frosts in winter. The buds should always have finished their spring growth, and come off readily before they are eyed.

The buds for this use should be taken only from the young shoots of the same summer's growth, which should be cut from the most healthy and thriving trees of the sorts intended to be propagated; and if fruit-trees, from such as bear the finest fruit of the different kinds and varieties. A quantity of the best moderately strong young shoots should be cut each day as they are wanted; and, as they are collected, all the leaves cut off, with about a quarter of an inch of their foot-stalks remaining, trimming off also the soft unripened top-ends of the cuttings; they should then be covered from the sun and air, and taken as wanted. And as

each cutting furnishes many buds, they should be cut into pieces about an inch and a half long, as they are inserted into the stocks. Those buds in the middle part of the cuttings are preferable to those towards the ends.

It is the common practice to insert one bud only in each stock; but some place two, one on each side, opposite each other.

The proper height to bud the stocks at varies according to circumstances. For dwarf-trees for walls and espaliers, &c. they should be budded from within about three to six inches of the bottom, that they may at first furnish branches near the ground. For half-standards, at the height of three or four feet; and for full standards, at from five to six or seven feet height; the stocks being trained accordingly. For half and full standards, the budding may, however, if necessary, be performed as low in the stock as for dwarfs, and the first shoot from the bud trained up to a proper height for a stem.

The proper apparatus for budding are, a small knife with a flat thin haft, for preparing the stock and buds for insertion, and opening the bark of the stock, to admit them, and a quantity of new bass strings to tie them, which should be previously well soaked in water to render them more tough.

As in this operation the head of the stock is not cut off, as in grafting, but left entire till the spring afterwards, and then cut off, a smooth part on the side of the stock, at the proper height, rather on the northward side, away from the sun, should be chosen for inserting the buds in; which should be done by making a horizontal cut across the rind of the stock, and from the middle of that a slit downwards about two inches in length, so that it may have the form of the letter T, being careful not to cut too deep, lest the stock should be wounded; then having cut off the leaf from the bud, leaving the foot-stalks remaining, a cross cut should be made about half an inch below the eye, and the bud slit off, with part of the wood to it, somewhat in form of an escutcheon: after this, that part of the wood which was taken with the bud should be separated, taking care that the eye of the bud be left; all those buds which lose their eyes in stripping, are useless; then gently raise the bark of the stock where the cross incision was made, with the flat haft of the knife clear to the wood, and thrust the bud into it; placing it smooth between the rind and the wood of the stock, cutting off any part of the rind of the bud, which may be too long for the slit made in the stock;

and having thus exactly fitted the bud to the stock, tie them closely round with bass mat, beginning at the under part of the slit, and proceed to the top, being careful not to bind round the eye of the bud, which must be left open and free.

But though it is the ordinary practice to divest the bud of that part of the wood which was taken from the shoot with it; in many sorts of tender trees, it is better to preserve a little wood to the bud, without which they often miscarry. This has occasioned some to imagine that some sorts of trees are not capable of being propagated by budding.

After the buds have been inserted three weeks or a month, they should be examined, to see which of them have taken; those which appear shrivelled and black, being dead, but those which remain fresh and plump have joined. At this time the bandage should be loosened, which, if not done in time, is apt to pinch the stock, and greatly injure if not destroy the bud.

In the following March, cut off the stock about three inches above the bud, in a sloping manner, that the wet may pass off, and not enter the stock; to the part of the stock left above the bud, the shoot which proceeds from the bud, which would otherwise be in danger of being blown out, may be tied the first year; after which it should be cut off close above the bud, that the stock may be covered by it. Some however think it a better practice to cut it close at once.

After this, the whole effort of the stock is directed to the inserted buds; they soon push forth strong, one shoot from each; many shoots also arise from the stock; but these should be constantly rubbed off as often as they appear, that all the powers of the stock may be collected for the vigour of the bud-shoot, which now commences the tree, and by the end of summer is in some sorts advanced three or four feet high; and in the autumn or spring following, the young trees may be transplanted into the places where they are to remain, or may remain longer in the nursery, according to the purposes for which they are designed.

Where the trees are of the fruit kinds, and designed for walls, espaliers, or dwarfs, the first shoot from the bud should, in the spring after it is produced, be headed down to four or five eyes, to force out first some lower shoots near the bottom; but if designed for half or full standards, and budded at proper heights, at first in tall stocks; the first shoot of the bud may either be shortened to four or five eyes, to

provide lateral branches near the top of the stem, to form a spreading head; or may be suffered to grow up in height, and branch out in its natural way, by which it will form a more erect head, of loftier growth. Such full or half standards as are designed for walls, and which were budded high on the stocks, must, however, necessarily have the first shoots headed down in the spring following, to force out lateral shoots to furnish the allotted space of walling.

But where trees are designed for any sort of standards, and budded low in the stock, the first shoot of the bud must be trained up for a stem to a proper height before it is stopped; and when arrived at its proper stature, be topped to throw out shoots to form a head at the desired height. See DWARF-TREES, ESPALIERS, WALL-TREES, and STANDARD-TREES.

BUDDLEA, a genus comprehending plants of the shrubby exotic green-house kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Personatæ*!

The characters of which are: that the calyx is a very small, four-cleft, acute, erect, permanent perianthium: the corolla is monopetalous, bell-form, four-cleft half way, erect, three times greater than the calyx: divisions ovate, straight acute: the stamina consist of four very short filaments placed at the divisions of the corolla: the anthers are very short, and simple: the pistillum is an ovate germ: the style simple, shorter by half than the corolla: the stigma obtuse: the pericarpium is an ovate capsule, oblong, two-furrowed, two-celled: the seeds numerous, extremely minute; adhering to a fungous receptacle.

The species cultivated are; 1. *B. Americana*, Long-spiked American Buddlea; 2. *B. occidentalis*, Spear-leaved Eastern Buddlea; 3. *B. globosa*, Round-headed Buddlea; 4. *B. salviifolia*, Sage-leaved Buddlea.

The first rises with a whitish woody stem from four to eight or ten feet in height, which is branched, and all over hoary: the leaves are ovate-lanceolate, opposite, serrate: the flowers are in long, slender spikes, axillary and terminating; composed of little, opposite, many-flowered, crowded racemes: the corolla is coriaceous, scarcely longer than the calyx: the divisions are upright, yellow within, and hoary on the outside. It is a native of America.

The second species rises much taller than the above, and divides into a great number of slender branches, which are covered with a russet hairy bark, with long spear-shaped leaves ending in sharp points: these grow opposite at every joint; at the end of the branches are pro-

duced branching spikes of white flowers, growing in whorls round the stalks, with small spaces between each. It has long, narrow, spear-shaped leaves growing between the spikes, but in the other sort they are naked. The leaves in this are much thinner than in the above species, and have scarce any down on their under side; the spikes of flowers grow more erect, and form a large loose spike at the end of every branch. It is a native of the West-Indies.

The third has a woody square stem: the leaves are serrate, sessile, acuminate, and tomentose underneath: the flowers have a yellow or orange colour, in close peduncled heads from the axils two together on opposite sides of the stalk and branches. It is a native of Chili; and flowers in May and June.

The fourth species rises with a shrubby four-cornered stalk eight or ten feet high, covered with a pale loose bark, and sends out many side branches. The leaves are five or six inches long, stem-clasping, acuminate, and downy on the under side. The branches are terminated by loose spikes of pale purple flowers, covered with a mealy down. It is a native of the Cape, and flowers in August and September.

Culture.—The two first species may be raised by sowing the seeds, procured in their capsules from the places where they grow naturally, in small pots filled with light earth, in the spring, covering them lightly, and plunging them in a hot-bed; occasional light waterings being given. The plants when sufficiently strong should be carefully separated, and planted out singly in other pots, being replunged in the hot-bed, and due shade, water, and air admitted. When these pots begin to be too small, they may be removed into others, and be placed in a refreshed tan hot-bed, where they should constantly remain. They should have little water during the winter season, but be kept warm. In summer much air and frequent refreshings of water, by sprinkling the plants all over, are however useful when the weather will admit.

The other species may be increased by planting cuttings from the young shoots in pots of light earth in the early spring season, plunging them into an old hot-bed, and, when they are become well rooted, removed into pots and placed in the shade till newly rooted, proper shade and moisture being given. They may then be placed in a warm border till the approach of winter, when they should be brought into the dry stove or greenhouse for protection. In mild winters, when protected from frost, it will sometimes succeed in warm sheltered borders in the open ground.

The plants are chiefly cultivated for ornament and variety in the stove and greenhouse.

BULB, a sort of large bud generated on the broad caudexes of plants within or in contact with the earth, and which shoot down their new roots directly into the ground; by which circumstances they are distinguished from buds, which are formed above the soil in the manner just described.

These are likewise further distinguished according to the manner in which they are constituted, into *tunicated bulbs*, *squamous bulbs*, and *solid bulbs*. The first sort is composed of several coats, closely infolding each other, as in the onion; and the second is constituted of different thin scaly plates placed over each other, similar to those in fish; as in the lily; while the third has a solid compact substance without any coats or divisions, as seen in the tulip.

Bulbs, like buds, Dr. Darwin observes, may be distinguished into leaf-bulbs and flower-bulbs; as “when a tulip seed is sown it produces a small plant the first summer, which dies in the autumn, and leaves in its place one or more bulbs. These are leaf-bulbs, which in the ensuing spring rise into stronger plants than those of the first year, but no flowers are yet generated; in the autumn these perish like the former, and leave in their places other leaf-bulbs, stronger or more perfect than their preceding parents.

“This succession of leaf-bulbs continues for four or five years, till at length the bulb acquires a greater perfection or maturity, necessary for seminal generation, and produces in its place a large flower-bulb in the centre, with several small leaf-bulbs around it.” It is suggested that this successive production of leaf-bulbs in plants of the bulbous-rooted kinds before the forming of a flower-bulb, is analogous to that of the producing of leaf-buds on different trees for many years previous to production of flower-buds. Thus, apple-trees raised from seeds afford only leaf-buds for a great number of years, but afterwards produce both flower-buds and leaf-buds. Hence it is conceived that the adherent lateral or paternal progeny is the most easy and simple, of course the first method of reproduction, and that the seminal progeny, for this reason, is not generated till the more mature age or more perfect state of the parent bud.

The author of the *Philosophy of Gardening* found, on dissecting two large roots of the onion kind in full flower, that the stem of each of them was surrounded by the cylindrical pedicles of six or seven concentric leaves; while the stem itself issued from the centre between three large new bulbs in one of them, and two in the other; all growing from the same caudex,

but the central flower-stem wrapped up at its bottom in one membrane only, separating it from the new bulbs near it. And on the examination of a large root of an onion produced from seed in the spring, by stripping off the leaves, and their fleshy bases one after another, until two buds were rendered visible in the centre of the fleshy bases of the concentric leaves that formed the bulb, it was found that these bulbs were obviously formed and nourished on the caudex by the stem, and its six or seven concentric cylindrical leaves. Or it is supposed from the difference in size, and seemingly increased maturity of the central bulb, as well as from the secondary bulb being placed between the innermost and second circular fleshy membrane, in these roots, as in those of the tulip, that merely the central bulb may produce a flower in the ensuing summer; while the lateral bulb or bulbs only afford stronger and more mature leaf-bulbs that in the succeeding summer produce a flower.

The caudexes or central parts of the bulbs, from which the roots descend and the leaves ascend, are placed differently in different roots; in some above the knot or bulb, in others below, and in others again in the centre.

In the tulip the caudex lies below the bulb whence the fibrous roots and new bulbs proceed, the root dying after it has flowered; the stem of the last year lying on the outside, and not in the centre of the new bulb. On examining a root of this sort in the early spring, immediately before it begins to shoot, a perfect flower may be seen in its centre, and between the first and second coat the large next year's bulb is believed to be produced; and between the second and third, and the third and fourth coats, other smaller bulbs are apparent, "all adjoining to the caudex at the bottom of the mother bulb;" which are said to require as many years before they flower, as the number of tunics by which they are covered. And similar different states of maturity, it is supposed, may take place in the buds round the shoots of different fruit-trees, the central one of which may afford flowers the ensuing year, as on the spurs of apple-trees; while those below require a greater or less number before "sufficiently mature to produce organs of sexual generation," which is a secret of great consequence in the management of trees of the fruit kind.

The root in the hyacinth differs from that of the tulip, as the stem of the last year's flower is said to be constantly met with in the centre of the root, the new offsets proceeding from the caudex below this bulb, and not from betwixt any of the concentric coats of it, except the

two exterior ones. For this reason the central part is apt, from its decay, to destroy the flower-bud unless removed from the ground at the time the leaves decay. On this account it has been supposed by florists, that these roots perish naturally in from five to seven years after flowering, while those of the tulip never die from their age.

The author of the *Philosophy of Gardening* found, on examining roots of this sort in September, that in one that had seemingly flowered during the summer, the stem was wholly decayed in the centre of various new bulbs, while in another, less in size, but compact, which was supposed not to have produced a flower, a central flower-bud was found inclosed in many concentric fleshy bases of former leaves. Hence he concludes that "the hyacinth root perishes annually or biennially, like the onion, leaving behind it a succession of leaf-bulbs or flower-bulbs." In the ranunculus, the caudex or claw-like root is believed to perish annually, after putting forth a circle of new claws from the upper part, round the bottom of the flower-stem: hence the claws of the old root, shrivelling as the flower advances, disappear in the autumn, and the decayed portion of the old caudex is visible below the new claw-like roots: hence the supposition of the old stem being drawn downwards by the new root fibres.

On these grounds it is concluded by Dr. Darwin, that "the concentric leaves that encircle the stem of bulb-rooted plants, are the lungs to the caudex, in the same manner as the leaves are to the buds in trees; and that the caudex with these leaves and the root-fibres constitute a vegetable that produces "a viviparous progeny of new leaf-bulbs, or a seminiferous progeny in flower-bulbs, with a magazine of nutriment in the fleshy base of each leaf." But that the tulip affords only leaf-bulbs for four or five years from the seed, and afterwards only one flower-bulb with many leaf-bulbs annually; while the onion kind produce two or three flower-bulbs in the first summer from the seed, which in the second afford flowers and other leaf-bulbs. And that it is probable, that all bulbous roots, as the buds of deciduous trees, and perhaps evergreens also, are properly biennial plants, as they rise in one summer and perish in the following.

When tulip or onion roots are planted deep in the earth, vegetable cords about an inch in length are seen sometimes to proceed from the caudex beneath the base of the cylindrical leaves, and form new bulbs. This is likewise the case in the natural growth of the roots of potatoes,

as similar spermatie cords are sent off from the old root, after the leaves of the stems are expanded in the air to oxygenate the juice, and in this way generate new tuberous or bulbous roots; a mode that is resembled above ground in the wires of strawberries.

These embryon vegetables, in the different bulbous and tuberous roots, are in different states of maturity, as was the case in the buds of trees: thus "in the potatoe the corculum or plumula of the new plant is only visible, surrounded with a farinaceous nutriment, as in many seeds," while in the tulip and hyacinth the flower of the succeeding is discernible, as in the bud of the horse chesnut.

The ripening of the seed of some bulbous-rooted plants is promoted by destroying the new bulbs; and in others the flowering-bulbs are made stronger by taking them out of the earth, and removing the leaf-bulbs, as practised in the culture of the tulip and hyacinth.

As the bulbous and tuberous roots of plants are a lateral or paternal progeny, like the buds of trees, and of course exactly resemble the parent plants, they may be liable to become unhealthy by being affected with hereditary diseases; as is the case in *canker* in apple-trees long propagated by grafting; the *curl* in potatoes continued for a great length of time by roots, and the barrenness in hautboy strawberries too long increased by wires.

In the set of bulbs produced above ground on the flower-stems in the place of seeds, as happens in the magical onion, leak, and some other plants; they, after undergoing proper maturation, drop off and take root in the earth. With respect to these it is remarked by Doctor Darwin, that "though a perfect flower precedes the product of some summit-bulbs, he suspects that in others, as the magical onion, they are exactly similar to the bulbs produced at the roots, as on cutting one horizontally into two hemispheres in September, he perceived "three young bulbs inclosed in the concentric fleshy membranes of the summit-bulb" in this manner: on taking away five thick fleshy concentric coats, there appeared a single naked small bulb; and on the removal of the sixth, two others became evident, which were included in it. Hence it is concluded that these stem-bulbs are as forward as those of the root, and probably in every respect similar; and that "the bractes or floral-leaves, which in seed-bearing plants secrete or prepare a nourishment for the bud and pericarp of the flower, acquire in these bulbiferous onions and leeks a new office, and prepare a magazine of nourishment in the concentric membranes which surround

their summit bulbs;" and may of course be considered "a sexual viviparous progeny of vegetables."

It is a question by no means yet decided, whether the plants from these bulbs are liable to have the exact resemblance of their parents, or to be affected with hereditary diseases, in consequence of being long cultivated in succession, as has been supposed to be the case in those noticed above.

BULBOUS ROOTS, such roots as are formed in the above manner, and which differ from those of the tuberous kind, which are entirely solid and fleshy.

They comprehend several esculent plants of the kitchen-garden, as garlick, onion, leek, shallot, &c. and many flowery plants of the hardy herbaceous perennial sorts; capable of succeeding in beds and borders in the open ground; and others for the stove and greenhouse.

The chief flowering sorts are: those of the amaryllis-kind, including the Guernsey lily, bella-donna lily, Jacobæa lily, &c.: the narcissus or daffodil kind, including jonquils, hyacinths, tulips, fritillaria, and crown imperial. The lily, including martagons; ornithogalum, or star of Bethlehem; galanthus, or snow-drop; leucojum, or great snow-drop; scilla, or sea-onion; colchicum; albuca, or bastard star of Bethlehem; muscaria, or musk and grape hyacinth; iris, the bulbous and Persian; hemanthus, or blood-flower; crocus, including spring and autumn kinds; bulbocodium; pancratium, or sea daffodil; and various others.

Most sorts of bulbous roots increase rapidly by off-sets, in which manner all the particular sorts are continued, but the new varieties are obtained from seed.

The duration of bulbous rooted plants is different according to the kinds, being in some not more than a year after having attained a flowering-stalk, but in others longer. Previous to their dissolution they afford from their sides, or other parts, a supply of new buds, suckers, or off-sets, to perpetuate the respective kinds; so that, at the end of several years, what is considered as the same individual root is in fact a new one.

All bulbous-rooted plants renew their leaves and flower-stems annually; the principal seasons for the latter being those of the spring and summer; some producing their flowers at one time, and their leaves at another, as in some of the amaryllis and colchicum kinds; others their flowers and leaves together, as the hyacinth, tulip, narcissus, &c. The leaves and flower-stems of all the sorts, likewise, perish annually

at certain periods after flowering, at which time the root becomes in an inactive state of growth for some time, as six weeks or two months; in which period, and before they put out new fibres, to prepare for the future flower, it is proper to remove them, either to separate the off-sets for propagation, to plant the roots in fresh prepared earth, or to convey them to any other place. And likewise to preserve them out of ground for autumn and spring planting.

Most sorts, taken up at this period, may be kept out of ground several months; and some sorts admit of being kept out of the ground, from the time the flowers and leaves decay, until the following spring, as is often practised, to obtain a longer succession of bloom in the flowers. But bulbous roots may remain several years unremoved; and, when greatly increased by off-sets, taken up at the proper period, to separate the increased progeny.

It is, however, necessary to take up all the choice kinds of bulbous roots annually, to separate the off-sets for increase, as well as to prepare the earth of the beds and borders afresh, to promote the fineness of the succeeding year's bloom, as in tulips, hyacinths, narcissus, &c. The inferior sorts of bulbous roots should also be removed every other year, or as often as their off-sets are considerably increased; as, when increased into large bunches, they cramp each other in growth, and produce small ill-nourished flowers. All the bulbous roots taken up at the above period, should, where practicable, be planted again the following autumn, as they flower much stronger in this way than when kept out of ground till the spring season.

In order to preserve them in the best manner, when out of the ground, they should be placed in a dry situation.

Mr. Marshall in his work on Gardening directs that autumn-flowering bulbs, when their leaves are decayed, should be taken up in May; and that none of the kinds remain too long without being taken up, as they are liable to be cramped and confined in their growth, and of course decline in their beauty.

It is recommended as the best practice, with flowering bulbs, to plant the spring kinds in the beginning of the autumn, as in the latter end of September, or beginning of the following month; and those of the summer flowering in October, or the succeeding month; and those of the autumn blow in the latter part of July, or in the following month;—too early and too late planting being equally to be avoided, as when put in too soon they are liable to be injured by being too forward when the

winter and early spring prove severe, and which delayed too long they are apt previously to exhaust themselves by forming roots.

Bulbs of the laminated kinds, such as lilies, should not be kept out of the soil longer than six or eight weeks; the summer-flowering sorts being set at separate periods in the autumn, and in the beginning of the year, before the latter end of February, so as to produce a succession of flowers. With others of a more delicate nature, this method is also common; but they should have a dry sandy soil in order to stand the winter without rotting, where there happens to be much wet, succeeded by severe frosts. In these cases the protection of mats and the haulm of peas may often be found useful.

When bulbs have remained in the ground longer than the proper period, so as to have struck out new roots, they should always be removed with balls of earth, as where this is not attended to they grow weak. On this account the exact period for removal should be carefully observed.

The off-sets of bulbous roots should, in general, be put into the ground a considerable time before the periods of planting out the full-sized roots; those taken from laminated bulbs mostly requiring to be immediately replanted.

The soil most adapted to the growth of bulbous roots in general, is that of a sandy loam, where there is no stagnation of moisture below. Many sorts of these roots are not, however, very difficult in this respect, provided there be not an over-proportion of moisture. The ground for them should be prepared by digging it to the depth of from six to eight or ten inches, or more, reducing it well in the operation. After this has been done, it should remain a week or ten days before they are put in to become perfectly settled.

In regard to the disposal of these roots in planting, it is, for the larger and more curious sorts, in beds a little rounded, of three, four, or more feet in width, according to circumstances, or in patches in the common borders for the smaller kinds, in clusters of three, four, or five together, according to their growth. With the large sorts, such as the white and orange lily, crown imperial, &c., one in a place is sufficient. The fancy sorts of flowering bulbs, when planted in beds, are usually put in rows eight or nine inches apart, and from five to seven inches distant, in proportion to their growth. Some prefer less room; but where a strong *blow* is required, these distances are not too great. Hyacinths should in general have the space of seven or eight inches, and

tulips eight or nine; though it is often the practice to allow the former not more than five or six inches.

The depths of setting roots of the bulbous kinds are in general according to their sizes or growths, as three or four inches from their upper parts. But some sorts, as the crown imperial and crocus, will rise from a considerable depth, as six inches or more, and others from still greater; which has induced some persons to plant them to such depths as are sufficient to prevent their being injured by digging over the surface ground.

Different methods are employed in planting bulbous roots, as those of putting them in by the dibble, and in drills drawn by a hoe. The latter is in general to be preferred, as they are apt to lie hollow in dibbling, while by placing them in a drill they may be gently pressed into the soil, and be perfectly covered up. When they are set in beds, the best method is to draw off the mould a sufficient depth to one side, leaving the surface perfectly level, watering it a little in dry seasons, and then forming it into proper squares, placing a bulb in the middle of each, covering them with the mould drawn off so as to leave the bulbs in an upright position. After the bulbs have been put into the earth, if the weather continue very dry, a little water should be sprinkled over the beds or other places, to forward their vegetation and prevent their rotting.

Some protection is occasionally necessary in raising the more curious sorts of flowers of these roots, as, before they appear during the winter, the beds should be sheltered from too much wet, in order to guard against the effects of frost. And when they first present themselves above the ground, they should have the protection of an awning of cloth, mats, or other contrivances in the nights when the weather is severe; but they should not remain on in the day-time when it is tolerable. Some sort of covering of the same sort is likewise necessary when they are in bloom, to shield them from the sun and rain, and continue them much longer in a perfect state of flowering.

There is a method of getting spring flowering bulbs forward, which is by setting them in pots or glasses for the purpose, in warm rooms, or in moderate hot-beds, as by these means they flower in winter. The hyacinth and narcissus, as well as several others, may be managed in this way with facility. These should be placed in pots of light dry sandy earth in autumn, as about the beginning of October, water being occasionally given. They may likewise be put into glasses at the same period,

and occasionally every three or four weeks, till the latter end of February, in order to have them flower in succession. In this method the bottom of the bulbs should be just immersed in the water, which should be renewed once a week or oftener, so as to keep it constantly up to the bottoms of the bulbs. Soft water is the best for this purpose. The *blow* is said, by Mr. Marshall, to be considerably strengthened by dissolving a portion of nitre, about the size of a pea, in the water each time it is changed.

Besides the raising of flowers from root-bulbs in these modes, there are some produced from little bulbs formed on the sides of the top-parts of the stems, as in the bulbiferous lily. These should be taken off about August, and, after being dried a little in the sun, planted out in rows in the nursery, in the same manner as off-sets.

By these means the various bulbous-rooted plants may be continued: but in order to produce new varieties recourse must be had to seed, which should be carefully saved, when fully ripened, from the best and most curious flowers, and which, after having been hardened a little in the sun, should be sown in boxes of light rich earth, setting them in a sheltered sunny situation, but not under cover. This is usually done about the latter end of August, or beginning of the following month; hyacinths, tulips, and other large sorts being covered to the depth of nearly an inch, and others, of the smaller sorts, half an inch. A little water should be occasionally given when the season is dry, to keep the soil moist, but not wet. The seeds may be protected till they come up, by a little covering of some kind of strawy material. Other sowings may be made in March, or the following month, the boxes being brought into southern exposures, where there is only the morning sun towards May. The young seedling plants should be protected in severe frosty weather, and when there is much rain, by means of mats and hoops, and a reed hurdle or other contrivance to break off the north-east winds.

The young plants should likewise be kept properly thinned out, and perfectly free from weeds. When the stems decay, a little mould should be put upon them to the thickness of half an inch. In the following summer, when the leaves decay, as about August, they should be planted out into nursery-beds, at the distance of two or three inches, according to the kinds. Some sorts, as the hyacinth and tulip, require to be removed from these into other nursery-beds as soon as their tops decline, and set at six inches distance; or it is probably a better

practice to thin them out to this distance in the first beds. After this they are to be managed as blowing plants. These sorts of roots blow at different lengths of time after being raised, some in the following year, and others not till several years afterwards; as will be explained under the culture of each of the different sorts.

BULBOCODIUM, a genus containing a plant of the bulbous-rooted flowering perennial kind. Mountain Saffron.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spatheaceae*.

The characters are: that there is no calyx: the corolla hexapetalous, funnel-form: claws very long, linear: throat connecting the petals: border erect: petals lanceolate, concave: the stamina consist of six subulate filaments, inserted into the claws of the petals: the anthers are incumbent: the pistillum is an ovate-subulate germ, obtusely three-cornered, and superior: the style is filiform, the length of the stamens: the stigmas three, oblong, erect and channelled: the pericarpium is a triangular, acuminate capsule, angles obscure, and three-celled: the seeds are numerous.

There is only one species cultivated for ornament, *B. vernum*, Spring-flowering Bulbocodium.

In this the bulb or root resembles that of common colchicum in shape, but is much smaller; it is covered with a dark-brown skin. In January, or before the middle of the following month, the flower springs up inclosed within three brownish-green leaves, which opening themselves as soon almost as they are out of the ground, show their buds for flowers within them very white oftentimes, before they open far, and sometimes also purplish at first appearing. There is frequently only one flower, but never more than two flowers on a root; they never rise above the leaves, or the leaves much higher than them, whilst they last; they are smaller than those of colchicum; at first are of a pale red or deep blush colour, but afterwards change to a bright purple, and continue long in beauty, if the weather be not severe. After the flowers are past, the leaves grow to the length of four or five inches, and in the middle of them the seed-vessel rises up.

It has the habit of colchicum, but differs in having only one style: from the crocus, which it much resembles, it is also distinguished by the number of its stamens. It is a native of Spain, &c.

Culture.—This may be increased by off-sets removed at the time when the flower and leaf decay,

every second or third year; also by sowing the seed in pots filled with loamy earth, in autumn, sheltering them in a frame from frost during the winter: the plants appear in spring, which, on the decay of the leaves, should be taken up for planting in the borders in the following autumn, where they flower the year following.

When the roots are not frequently taken up, they flower much stronger, and produce a greater increase than when treated in the contrary manner.

The plants should have a warm situation, and fresh soil that has not been improved by manure.

They afford an agreeable variety in beds, borders, and clumps, of pleasure- and other grounds.

BUPHTHALMUM, a genus comprehending plants of the herbaceous and shrubby kinds. The Ox-eye.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositae*.

The characters are: that the calyx is common various in the different species, imbricate: the corolla is compound radiated: corollules hermaphrodite, numerous, forming a flat disk: females more than ten in the ray. Proper of the hermaphrodite funnel-form, with a five-cleft, patulous border. Of the female ligulate, longer, spreading, three-toothed: the stamina (of the hermaphrodite) consist of five capillary, very short filaments: the anthers are tubular and cylindric: the pistillum (of the hermaphrodite) is an ovate, compressed germ: the style is filiform, the length of the stamens: the stigma thickish and simple. Of the female, the germ ancipital: style filiform, of the same length as in the hermaphrodite: the stigmas two, and oblong: no pericarpium: the calyx unchanged: the seeds of the hermaphrodite solitary, oblong, crowned with a gashed manifold edge. Of the females, solitary, compressed, with each edge cutting, crowned like the others: the receptacle is chaffy and convex.

The species are; 1. *B. helianthoides*, Sun-flower-leaved Ox-eye; 2. *B. salicifolium*, Willow-leaved Ox-eye; 3. *B. grandiflorum*, Great-flowered Ox-eye; 4. *B. maritimum*, Sea Ox-eye; 5. *B. frutescens*, Shrubby Ox-eye; 6. *B. arborescens*, Tree Ox-eye.

The first has a perennial root, branched, whitish, and fragrant. The stems are annual, several, upright, branched at top, naked at the base, round, the thickness of a quill, red with a sea-green bloom, pithy and jointed as it were with a ring of petioles: the twigs opposite, and

length, forming an upright umbel, surrounded at bottom by an involucre of three withering membranous sheaths; besides a smaller stipule to each peduncle: corolla handsome, near an inch in breadth; commonly of a bright or pale flesh-colour, purple or rose-colour. It is a native of most parts of Europe, and flowers in June and July.

There are varieties with white flowers; with red flowers; with deep purple flowers.

Culture.—The propagation in this plant is effected either by seed, or the roots. In the first mode the seed may be sown thick, in any watery or boggy place, in the autumn, and left to nature. In the second method the roots should be removed any time after flowering, and such as admit of it, divided, planting them at once in the places allotted them, where they flower annually for a great length of time.

These plants are very ornamental on the sides of waters, or in soft boggy situations, in pleasure grounds.

BUXUS, a genus containing plants of the hardy evergreen kind.

It belongs to the class and order *Monoecia Tetrandria*, and ranks in the natural order of *Tricocceae*.

The characters are: that the male flowers are prominent from the buds of the plant: the calyx is a three-leaved perianthium: leaflets roundish, obtuse, concave, and spreading: the corolla consists of two roundish, concave petals, very like the calyx, but larger: the stamina consist of four subulate filaments, erect-expanding, rather larger than the calyx: the anthers are erect and twin: the pistillum is the rudiment of a germ, without style or stigma. The females in the same bud with the males: the calyx is a four-leaved perianthium: leaflets roundish, obtuse, concave, spreading: the corolla consists of three roundish, concave petals, very like the calyx, but larger: the pistillum is a superior germ, roundish, obtusely three-cornered, ending in three very short, permanent styles: the stigmas obtuse, hispid: the pericarpium is a coriaceous, roundish, three-beaked, three-celled capsule, bursting elastically into three parts: the seeds are twin, oblong, rounded on one side, flat on the other.

There is only one species: *B. sempervirens*, Evergreen Tree Box.

It is observed by Martyn, that Box, in its dwarf state, is a well-known shrubby plant, about three feet in height; that when left to itself, it becomes a tree, twelve or fifteen feet high, with a trunk equalling the human thigh in thickness, covered with a rugged, grayish bark, that of the branches yellowish. The wood is of

a yellow colour, of an even close grain; very hard and ponderous. The leaves are ovate or oval in the common sort, hard, smooth, glossy, evergreen, very dark green above, pale green underneath, something resembling those of myrtle, but blunt and commonly emarginate at the end: the edges are revolute: they are set on very short petioles, and on the twigs they come out regularly in pairs, so close as almost to conceal them. On these, from the axils of the leaves, come out the small herbaceous flowers, in round bunches; a female flower occupying the middle of the bunch, and being surrounded by several males. It is a native of most parts of Europe.

There are varieties of Tree Box with broad leaves, with narrow leaves, with silver-striped leaves, with silver-edged leaves, with gold-striped leaves, with gold-edged leaves, with gold-tipped leaves, with curled striped leaves: and of the Dwarf shrubby kind there are sub-varieties, with green leaves and with striped leaves.

Culture.—This species and all the different varieties of Box may be easily raised either by seeds, layers, or cuttings, though the two last are the methods most commonly employed, and the only ones for the variegated sorts, so as to continue the different kinds with certainty.

In the first mode the seed should be sown in autumn, soon after it becomes ripe, in a border of light earth, half an inch deep. The plants appear in spring, and are fit to plant out in the nursery, in rows, in about two years afterwards. They may be increased in the layer method any time in the year; but the spring is the most eligible season, or in the autumn, as they will be well rooted for planting out in the autumn following.

When raised by cuttings, they may be planted in autumn, or any time in the spring, but the sooner the better; for which purpose shoots of one or two years' wood should be chosen about six or eight inches long, and planted in a shady border half way in the earth, and six inches distant, water being freely given in dry weather.

The Dwarf sort may be propagated very readily by off-sets or suckers from the roots, which may be parted any time from the autumn to the spring, or even later. Those intended to be trained as shrubs should be planted singly in rows in the nursery a foot asunder; but when intended for edgings, they may be planted close to one another, in rows; the slips with small root fibres being chiefly made use of for the purpose.

For the purpose of edgings, such plants as are short and bushy are to be preferred, and those whose roots are short and very fibrous.

The dwarf shrubby kinds of these plants are often cultivated for sale in the nurseries, for edgings, being planted in close rows, and commonly sold by measurement, generally at about six-pence per yard, running measure, and one yard of which, when good and close, will plant three or four on being parted.

In parting the Box for edgings, it should not be divided into very small slips, but, if possible, each slip should be furnished with fibres; for although the naked or rootless slips will grow, they should not be planted with the rooted ones, as many may fail, and occasion gaps in the edgings. The plants when slipped should be trimmed both at root and top, cutting off or shortening the long sticky roots, but the tops

should not be cut too close to appear stubby. See EDGING.

All the varieties are hardy, and capable of succeeding on almost any sorts of soil and exposures. When cultivated for the wood, which is of a fine hard dense texture, they may be planted on the poor chalky or gravelly soils with success.

The different sorts, when planted as shrubs, have a very ornamental effect in the fronts and other parts of the borders and clumps of pleasure-grounds, in assemblage with others of the more large-leaved evergreen kind. They are likewise employed for the forming of ornamental hedges, and for being clipped into different forms.

C A C

C A C

CABBAGE. See BRASSICA.
CABBAGE-TREE. See CACALIA KLEINIA.

CACALIA, a genus comprehending hardy herbaceous, flowery, perennial, and shrubby plants. Foreign Coltsfoot.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common simple, oblong, at the base only sub-calyced, cylindric: the scales five to ten, equal, lanceolate-linear, forming a tube; a few very short, incumbent on the base: the corolla is compound and tubular: the corollules are hermaphrodite, in number the same as the longer leaves of the calyx, and uniform; proper funnel-form, gradually lessening to the tube: border four- or five-cleft, and erect: the stamina consist of five capillary filaments, very short: the anther cylindric and tubular: the pistillum is an oblong germ: the style filiform, the length of the stamens: the stigmas two, oblong and revolute: the pericarpium none: the calyx unchanged: the seeds solitary, oblong, and ovate-narrow: the down capillary, and very long: the receptacle is naked, flat, and dotted.

The species most commonly cultivated are: 1. *C. suaveolens*, Sweet-scented Cacalia; 2. *C. atriplicifolia*, Orach-leaved Cacalia; 3. *C. Alpina*, Alpine Purple Cacalia; 4. *C. papillaris*, Rough-stalked Cacalia; 5. *C. Antephorbium*, Oval-leaved Cacalia; 6. *C. Kleinia*, Oleander-

leaved Cacalia, or Cabbage-tree; 7. *C. Ficoides*, Flat-leaved Cacalia. There are several other species that are equally deserving of cultivation.

The first species has a perennial creeping root, sending out many stalks: the leaves are long, smooth, and veined, of a pale green on their under side, but a deep shining green above, and placed alternately. The stalks rise to the height of seven or eight feet, are streaked, quite simple, and terminated by corymbs of white flowers. It smells very sweet when dry; and is a native of Virginia and Canada, flowering in August and ripening its seeds in October.

The second species has also a perennial root, composed of many fleshy spreading tubers, sending out several strong stalks in the spring, four or five feet high: the leaves are sea-green on their under side, but darker above, placed alternately the length of the stalks, which are terminated by umbels of herbaceous-coloured flowers. It is of the same size and stature with the above, and a native of Virginia, flowering here in August.

The third has likewise a perennial root: the stem is a foot and half high, or more, leafy and branching at intervals: the leaves are on very long petioles; the lowest either very long heart-shaped, or broader approaching to kidney-shaped, with the intervals of the toothings semi-lunar; some are wholly smooth; some have the nerves only hairy; others are wholly tomentose, and thicker. The stem branches at top, and on the subdivisions, bear a broad and dense corymb of flowers. It is a native of Switzerland.

There are varieties with smooth green leaves, with hairy leaves, and with hairy thick leaves.

The fourth species resembles the sixth in its form and manner of growth, but the leaves are narrower and more succulent. These do not fall off entire, as in the other, but break off at the beginning of the foot-stalks, which are very strong and thick, and always continue; so that the main stalk of the plant, and the lower part of the branches, which are destitute of leaves, are set round on every side with three truncated foot-stalks, and thus defended in a singular manner from external injuries. It is a native of the Cape, but has not yet flowered in this climate.

The fifth rises with many succulent stalks from the roots, as large as a man's finger, branching out upwards into many irregular stalks of the same form, but smaller: the leaves are succulent, alternate, blunt; under each foot-stalk are three smooth lines or ribs which run along the branch. It is a native of the Cape, but rarely flowers here.

The sixth species rises with a thick fleshy stem, divided at certain distances, as it were, into so many joints; each of these divisions swells much larger in the middle. The stalks divide into many irregular branches of the same form, which towards their extremities have long, narrow leaves, of a glaucous colour, standing all round without order. As these fall off, they leave a scar at the place, which always remains on the branches. The flowers are produced in large clusters at the extremities, and are of a faint carnation colour. It grows naturally in the Canary islands, flowering in August and the two following months, but does not produce seed here.

It is denominated *Cabbage-tree* by some, from the resemblance which the stalks have to those of cabbage: and others have named it *Carnation-tree*, from the shape of the leaves and colour of the flowers.

The seventh species rises with strong round stalks to the height of seven or eight feet; which are woody at bottom, but soft and succulent upwards, sending out many irregular branches. These, for more than half their length, have thick, taper, succulent leaves, a little compressed on two sides, ending in points, covered with a whitish meal: when broken, they emit a strong odour of turpentine, and are full of a viscid juice. At the extremities of the branches the flowers are produced in small umbels; which are white, and cut into five parts at top: the stigma is of a dark purple colour, and stands erect above the tube. The seeds do not ripen here.

In France, the leaves are sometimes pickled, with the white meal preserved on them. It is a native of the Cape of Good Hope, flowering from June to November.

The first three species are herbaceous, and hardy enough to be planted in the open ground; but the last four are shrubby, and require the protection of a green-house in the winter.

Culture.—The herbaceous kinds may be raised either by their roots or the seeds. In the first method, the roots should be divided and planted out either in the autumn or early in the spring. In the latter mode, the seeds should be sown or left to shed in the autumn or spring seasons.

The shrubby species may be easily increased by cuttings of the young branches, which should be planted in pots of light sandy mould, during the spring or summer months, after being cut into pieces of five or six inches in length, and left some days exposed to dry and heal over the cut parts. Those planted in the spring season may be plunged in a hot-bed, but during the summer they take root easily without such aids.

The first sorts afford variety in the large clumps and borders of extensive pleasure-grounds; and the latter sorts, from the singularity of their growth, produce much variety in the green-house in assemblage with other curious plants.

CACTUS, a genus comprising plants of the succulent exotic kind. The Melon Thistle, Torch Thistle, Creeping Cereus, and Indian Fig sorts.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Succulentae*.

The characters are: that the calyx is an one-leaved, imbricate, hollow-tubular perianthium, with scaly leaflets scattered over it, superior, deciduous: the petals numerous, rather obtuse and broad; the outer ones shorter; the inner larger and converging: the stamina consist of numerous subulate filaments inserted into the calyx: the anthers oblong, erect: the pistillum is an inferior germ: the style the length of the stamens, cylindric: the stigma headed and multifid: the pericarpium is a berry rather oblong, one-celled, umbilicate, and roughened as the calyx is: the seeds are numerous, roundish, small, nestling.

The species chiefly cultivated as curious or ornamental plants are: 1. *C. mammellaris*, Smaller Cactus, or Melon Thistle; 2. *C. Melo-cactus*, Melo-cactus, Great Melon Thistle, or Turk's Cap; 3. *C. tetragonus*, Four-angled Upright Cereus, or Torch Thistle; 4. *C. penta-*

gonus, Five-angled Upright Torch Thistle; 5. *C. hexagonus*, Six-angled Upright Torch Thistle; 6. *C. heptagonus*, Seven-angled Upright Torch Thistle; 7. *C. repandus*, Slender Upright Torch Thistle; 8. *C. lanuginosus*, Woolly Upright Torch Thistle; 9. *C. Peruvianus*, Peruvian Upright Torch Thistle; 10. *C. Royeni*, Royen's Upright Torch Thistle; 11. *C. grandiflorus*, Great-flowering Creeping Cereus; 12. *C. flagelliformis*, Pink-flowering Creeping Cereus; 13. *C. triangularis*, Triangular Cereus, or Strawberry Pear; 14. *C. Opuntia*, Common Indian Fig, or Prickly Pear; 15. *C. Ficus Indica*, Oblong Indian Fig; 16. *C. Turca*, Great Indian Fig, or Prickly Pear; 17. *C. cochenillifer*, Cochineal Indian Fig; 18. *C. Curassavicus*, Curassao, or Least Indian Fig, or Pin-pillow; 19. *C. spinosissimus*, Cluster-spined Indian Fig; 20. *C. Phyllanthus*, Spleen-wort-leaved Indian Fig; 21. *C. alatus*, Narrow Long-jointed Indian Fig; 22. *C. moniliformis*, Neck-lace Indian Fig; 23. *C. pereskia*, Barbadoes Gooseberry.

The first differs from the following species in being smaller and covered all over with tubercles, between which the flowers and fruit come out, round the middle of the plant: the body is roundish, oblong, or melon-shaped: the flowers appear in July and August: the fruit is of a fine scarlet colour, continuing fresh upon the plants during the winter, which has a very beautiful effect at that season.

There are varieties with white spines, with red spines, and a profliferous or childing variety: this is only a little larger than the other, growing nearly in the same form, but produces a great number of young plants from the sides: it has tufts of a soft white down upon the tubercles or knobs, and also between them; the whole plant appearing as if covered with fine cotton: the flowers are larger, but not succeeded by fruit in this climate, young plants being thrust out in their stead the following season from the places where the flowers had been.

The second species appears like a large fleshy green melon, having deep ribs, set all over with strong sharp thorns. When cut through the middle, the inside is found to be a soft, green, fleshy substance, very full of moisture. The flowers and fruit are produced in circles round the upper part of the cap. Some brought hither have been more than a yard in circumference, and two feet and a half high including the caps; but in the West Indies there are plants much larger. They resemble a hedge-hog in their form and spines.

There are varieties with straight angles, with fifteen angles spirally twisted and erect spines, with fifteen angles and broad recurved spines,

with fourteen angles and broad recurved spines, with fourteen angles and white spines.

The third species has an upright four-angled succulent stem; the angles are compressed, armed with spines, and far asunder. It is subject to put out many shoots from the sides, which stops its upright growth, so that the plants rarely rise more than four or five feet in height.

The fourth has a succulent jointed stem; the internodes a foot long: knots of spines come out along the edge without any visible nap among them; and sometimes, but rarely, the stem has six angles: it never puts out any roots, and, though slender and weak, grows upright to the height of several feet.

In the fifth species the angles are armed with sharp spines, coming out in clusters at certain distances, and spreading from a centre every way: the outer substance of the plant is soft, herbaceous, and full of juice, but in the middle there is a strong fibrous circle running the whole length, which secures the stems from being broken by winds: they rise to the height of thirty or forty feet when their tops are not injured, and they have room to grow; but whenever the stems are cut, or injured, they put out shoots from the angles, immediately under the wounded part, and frequently one or two lower down: these, when not cut off, form distinct stems, and grow upright; but they are seldom so large as the principal one, especially if more than one be left on a plant. The flowers come out from the angles on the side of the stem; and have a thick, fleshy, scaly, round, channelled, hairy peduncle, supporting a swelling germ, upon the top of which sits the scaly, prickly calyx, closely surrounding the corolla till a little time before it expands: the flower is then as large as that of a hollyhock; the inner petals being white and crenated at their extremity: the calyx is green, with some purple stripes: it is not succeeded by fruit in this climate, nor do the plants produce flowers frequently; but when this happens, there are generally several. The usual time of flowering is in July.

The sixth has an upright shorter stem, which is oblong and seven-angled, the angles deeply cut and armed with spines. According to some, it runs to the height of a foot and a half or two feet. It has not flowered in this climate.

The seventh species is described as having the smallest stem of any of the upright sorts; generally with nine obtuse angles armed with short spines, placed at further distances than those of the other sorts, and the channels between the angles not near so deep. The flowers are produced from the angles in the same manner as the fifth; but are smaller, and the calyx is of a high

green, without any mixture of colour. The fruit is about the size and shape of a bergamot pear, having many soft spines on the skin; the outside being of a pale yellow, the inside very white, full of pulp, having a great number of small black seeds lodged in it. It frequently flowers in July, and in warm seasons perfects its fruit, which has little flavour in this climate, but is often eaten in the West Indies.

The eighth has the stem upright, slightly nine-angled, thick, and very spiny: the spines, especially the younger ones, have a brownish wool about them: the fruit is of the size and form of a hen's egg, red on the outside and without spines. It is a native of America.

The ninth species has the stem from six to eight feet in height, almost simple, upright, two or three inches in diameter, blunt at the end, having ten deep angles set with thorns, crowded eight or ten together, about an inch in length, spreading, the inner ones shorter and tomentose at the base: the angles at the top have the spines concealed among the wool, and they come out gradually as the stem grows up: the wool is white and brown: flowers sessile, in the very angles of the extremities, scattered; ovate at the base, two inches long, elongated, red: the berry is unarmed, blood red within, and eatable.

The tenth rises with an upright, nine-angled, jointed stem. The joints are sub-ovate, and the spines and down are nearly of equal length.

The eleventh species, when of sufficient strength, produces many exceeding large, beautiful, sweet-scented flowers, of short duration, scarcely continuing six hours full blown, nor opening again when once closed; they mostly begin to open about seven or eight o'clock in the evening, are fully blown by eleven, and by three or four in the morning fade, and hang down in a decayed state; but, during their short continuance, there is scarcely any flower of greater beauty or more magnificent appearance; as the calyx of the flower, when open, is nearly a foot in diameter; the inside being of a splendid yellow colour, appearing like the rays of a bright star, the outside dark brown: the petals are of a pure white; and the great number of recurved stamens that surround the style in the centre of the flower make a fine appearance. The flowers perfume the air to a considerable distance with their fine scent. It may be trained against the walls of the hot-house, where it takes up little room. It usually flowers in July; and when the plants are large, many flowers open the same night, and there is a succession of them for several nights. Sometimes six, eight, or ten flowers open at the same time on one plant,

which have a most magnificent appearance by candle-light; but none of them are succeeded by fruit in this climate. It is a native of Jamaica, &c.

The twelfth produces a greater number of flowers than the above, which come out in May, and sometimes earlier when the season is warm: the petals are of a fine pink colour both within and without; they are not so numerous, and the tube of the flower is longer than that of the other. These flowers keep open three or four days, provided the weather, or the place where the plants stand, be not too warm; and during their continuance make a fine appearance. It has very slender trailing stalks or branches, which require support; they are not jointed, nor do they extend so far as those of the other sort; so that they may be easily trained to a little wooden trellis, and conveyed into the house whilst in flower. The flowers are so beautiful, and in such plenty, as to render it one of the most valuable exotic plants. It does not ripen fruit in this climate. It grows naturally in Peru.

The thirteenth species climbs up trees or other supports to a considerable height, supporting itself by throwing out roots; it also covers shady rocks. The stalks are triangular and jointed: the fruit is the best flavoured of any of the sorts, being slightly acid, with a mixture of sweetness, pleasant and cooling. It has no leaves, but is somewhat irregular with scars. The flowers are large, white, and beautiful. It is a native of the West Indies.

There is a variety in which the fruit is much larger, and of a shining scarlet colour, and which is clothed with leaves that are almost entire.

In the fourteenth species the joints or branches are ovate, compressed, and have very small leaves coming out in knots on their surfaces, as also on their upper edges, which fall off in a short time; and at the same knots there are three or four short bristly spines, which do not appear unless they are closely viewed; but on being handled they enter the skin, are troublesome, and very difficult to get out again. The branches spread near the ground, and frequently trail upon it, putting out new roots, and thus extending to a considerable distance, but never rising in height; they are fleshy and herbaceous whilst young, but as they grow old become drier, of a tough contexture, and have woody fibres. The flowers come out on the upper edges of the branches generally, though sometimes they are produced on their sides, and are of a yellow colour. The skin or cover of the fruit is set with small spines in clusters, and the inside

is fleshy, of a purple or red colour. It flowers here in July and August; but, unless the season is very warm, the fruit does not ripen in this climate. It is a native of America.

The fifteenth has the branches growing more upright than in the above sort, and armed with long bristly spines, coming out in clusters on both the compressed sides, spreading open like the rays of a star. The flowers come out from the upper edges of the leaves, as in the former; but are larger, and of a brighter yellow colour. The fruit is also larger, and of a deeper purple colour; the outer skin is likewise armed with longer spines. It is a native of South America.

The sixteenth species has stronger branches than the above, and armed with larger thorns, which are awl-shaped, whitish, and in clusters. The flowers are large, of a bright yellow colour; and the fruit shaped like that of the above, and of a purple colour. It is a native of South America.

There are varieties which are taller, the branches larger, thicker, and of a deeper green, and armed with strong black spines, coming out in clusters which are far asunder, and which are the largest of all the sorts known. The joints more than a foot long, and eight inches broad; very thick, of a deep green colour, and armed with a few short spines.

The seventeenth species has oblong, smooth, fleshy, jointed, upright branches, rising to the height of eight or ten feet, having scarcely any spines on them, and those few so soft as not to be troublesome when handled. The flowers are small, and of a purple colour, which do not spread open, but appear late in autumn, and the fruit drops off in winter without coming to perfection. It is supposed to be the sort upon which the cochineal insect feeds.

The eighteenth species has thicker, more swelling joints than the other sorts, closely armed with slender white spines. The branches spread out on every side, and where they have no support fall to the ground, very often separating at the joints, and as they lie putting out roots, and forming new plants. This sort rarely produces flowers in this climate. It is called *Pia-pillow*, from the appearance which the branches have to a pincushion stuck full of pins. It is said to be a native of Curassao.

In the nineteenth the branches have the joints much longer, narrower, and more compressed than in any of the others. The spines are very long, slender, and of a yellowish brown colour, coming out in clusters all over the surface of the branches, crossing each other, so as to render the plant dangerous to handle; as, upon being touched, the spines quit the branches, adhere to the hand, and penetrate the skin; the trunk

below the branches being so absolutely covered with spines as to be invisible, and seems nothing but a congeries of them. Hence it has been whimsically named Robinson Crusoe's Coat. Its growth is more upright and lofty than in the other *Opuntias*. The branches are remarkably neat and flatted, seldom subdividing much, but protending horizontally in a double row in the same plane. The spines are very long and slender, in parcels, and have a woolly tuft at their base, which is most evident in the more tender joints.

The twentieth species has very thin branches, which are indented regularly on their edges, like *Spleenwort*; they are of a light green, shaped like a broad-sword, and without spines. The flowers come out from the side, and at the end of the branches, and are of a pale yellow colour. The fruit rarely ripens in this climate. It grows naturally in the Brazils.

The twenty-first has a round stem, ash-coloured, flexible, whence issue several leaves, which at first are very hairy, and afterwards grow to a foot in length, and an inch broad in the middle, decreasing to both extremes; they are of a pale green colour, and have round indentures on their edges; out of these proceed the flowers. The fruit is small and compressed. It is a native of Jamaica.

The twenty-second species is a sessile plant, consisting of globular joints growing out of each other, armed with very long, sharp, subulate spines, commonly solitary, but sometimes coming out two together. The flowers are produced from the upper joint, they are sessile, the tube is long and scaly, the petals spreading and sinuous, the style very long and prominent, and the stigma very broad and many-parted. This is a very singular plant, and the least known of any. It is a native of South America.

The last species has many slender branches, which trail on whatever plants grow near them. These, as well as the stem of the plant, are beset with long whitish spines, which are produced in tufts. The leaves are roundish, very thick and succulent; and the fruit is about the size of a walnut, having tufts of small leaves on it, and within a whitish mucilaginous pulp. It grows in some parts of the Spanish West Indies.

Culture in the Melon-Thistle kind.—The propagation in these plants is effected either by sowing the seeds in pots of light sandy earth, plunging them in the bark-bed; when, after they have advanced a little in growth, they should be pricked out into separate very small pots, replunging them in the bark-bed, where they make great progress, though it is some years

before they acquire any considerable size or growth; or by setting the young plants which issue from the sides of the old ones in pots of the same sort of earth in the spring or autumn, managing them in the same way as those from seed.

But to have large plants at once, they may be procured from the West Indies in tubs of dry compost rubbish, care being taken to guard them from cold and moisture. On their arrival they should be planted in pots, and plunged in the bark-bed till perfectly rooted and become strong.

These plants should be placed upon the tops of the flues or shelves in the stoves in winter, and in the bark-beds in summer; very moderate waterings being given in very hot weather, but none at all in winter, as they are very succulent plants. They are of very singular growth.

Culture in the Cereus, or Torch-Thistle kind.—These plants are increased by planting the cuttings of the branches, which have been laid in a dry place some weeks for the moisture to exhale and the wounded parts to be healed over, in small pots, in the summer season, filled with a compost constituted of one third light earth, the same quantity of sea-sand and sifted lime rubbish, well mixed together, for some length of time, plunging them in the bark hot-bed of the stove, some rather coarse gravel being previously placed in the bottoms of the pots to prevent the stagnation of moisture.

In the upright sorts, the cuttings for this use may be provided by taking off the tops of such kinds as are wanted; the plants afterwards throwing out shoots below, so as to furnish plentiful supplies annually. But in the creeping sorts, as there are various stalks and branches, these may be taken off in cuttings of from three to five or six inches in length, and planted in the same way.

About the middle of August, the plants after being raised in this manner should have air given them by degrees, to harden them against winter, but not wholly exposed to it or the sun, and at the end of September removed into the stove, or green-house, for the winter, during which season they must not have much water. The young plants, for the first winter, should always be placed in a little warmer situation than the older ones, as being more tender.

These plants should constantly have as dry situations as possible in winter, as they imbibe the greatest part of their nourishment from the air, to prevent their roots from rotting; and should not be much exposed in the open air even in summer, unless under shelter, as rains are very injurious to them: nor should the creeping sorts be exposed too much to the open air, even in

the hottest season, if they are designed to flower, but in winter be kept very warm, and have no water given them.

The Great-flowering Creeping Cereus is a tender plant that requires a warm stove to protect it, in which it may be trained against the walls or upon sticks. But the six-angled and the small sort, with pink-coloured flowers, are not so tender, being capable of being preserved in a good green-house, or when placed under a hot-bed frame in winter.

Culture in the Indian Fig kind.—These plants may be readily increased by cuttings of the joints of the branches, taken off and planted in pots of light sandy compost, during the early summer months. These cuttings, previous to planting, should, as in the other sorts, be laid in a dry place ten or fifteen days to heal over the cut parts; and the hot-house kinds, by being then plunged in the bark-bed, or other hot-bed, will be greatly promoted in their rooting; but the green-house sort, or Common Opuntia, readily strikes root without, though it is greatly forwarded by such assistance. They all require the earth to be occasionally moistened a little.

In the summer season they often require water, but it must not be given in large quantities, lest it rot them, and in winter it should be proportioned to the warmth of the stove; as, if the air be kept very warm, they require to be often refreshed, to prevent the branches shrinking; but if kept in only a moderate degree of warmth, little is necessary. The heat in which they thrive best is that marked temperate on botanical thermometers, as, when they are kept too warm in winter, it causes their shoots to be very weak and tender. The sorts which are inclinable to grow upright should have their branches supported with stakes, to prevent their being broken down by their own weight.

Plants of this sort are mostly exposed to the open air in the summer season; but they thrive much better when continued in the stoves, provided they have free air; as, when set abroad, the rains much diminish their beauty, retard their growth, and prevent their producing flowers and fruit in such plenty as when constantly kept in the house.

These are all plants of curious growth, and which afford much variety as well as singularity of effect when introduced among the stove and green-house collections.

CÆSALPINIA, a genus containing a plant of the shrubby exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters of which are: that the calyx is a one-leaved, five-parted perianthium: the tube short: segments oblong, deciduous, the lowest longer than the rest, and slightly arched: the corolla has five petals, inserted into the throat of the calycine tube, unequal: the lamina roundish: the stamina consist of ten filaments, inserted into the throat of the calyx, filiform, woolly at the base, and declining: the anthers are oblong and decumbent: the pistillum is a superior germ, linear-oblong, compressed and attenuated at the base: the style filiform, the length of the stamens: the stigma blunt: the pericarpium is an oblong, compressed, one-celled legume: the seeds few, subovate, compressed, and flat.

The species chiefly cultivated is the *C. pulcherrima*, Beautiful Brasiletto or Barbadoes Flower-fence.

This rises with a straight stalk, ten or twelve feet in height; it is covered with a smooth gray bark, and is sometimes as thick as the small of a man's leg; it divides into several spreading branches at the top, armed at each joint with two short strong crooked spines. The leaves are doubly pinnate; leaflets from four to eight pairs, most in the middle, decreasing in number both at top and bottom, three quarters of an inch long, almost half an inch broad at the end, lessening gradually to the base, light green; when bruised emitting a strong odour like savin. The branches are terminated by loose spikes of flowers, which are sometimes formed into a kind of pyramid, and at others are composed more in form of an umbel. The peduncle of each flower is near three inches long. The petals are roundish at the top, but are contracted to narrow tails or claws at their base; they spread open, and are beautifully variegated with a deep red or orange colour, yellow, and some spots of green; they have a very agreeable odour. This is a beautiful plant, and a native of both Indies. It is planted in hedges to divide the lands in Barbadoes, whence it has the name of Flower-fence; and is also called Spanish Carnation, Wild Sena, &c. It flowers here in December, but in its native situation twice in the year.

Culture.—It may be increased by sowing the seeds in the early spring months, in pots filled with good light rich mould, plunging them in a gentle, bark hot-bed, watering the earth occasionally to keep it from becoming dry, and shading the plants when up, as well as protecting them well from frosts during the nights. When two or three inches high, they should be set out singly into small pots, being replunged

in the hot-bed, watered, shaded, and protected as there may be occasion. When well rooted, the air should be admitted freely in proper weather. The protection of the stove is necessary during the winter. When the plants are grown large, there must be great care taken in shifting them into larger pots, not to suffer the ball of earth to fall from their roots; as, when this happens, the plants seldom survive it. They are very impatient of moisture in winter; and when damp seizes their tops it often kills them, or at least occasions the loss of their heads.

This is a very ornamental plant in the stove or green-house collections.

CALABASH-TREE. See CRESCENTIA.

CALAMUS AROMATICUS. See ACORUS.

CALENDULA, a genus comprising plants of the hardy annual perennial flowery and shrubby kinds. The Marigold.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Discoidææ*.

The characters of which are: that the calyx is common simple, many-leaved, almost upright: segments linear-lanceolate, (fourteen to twenty) nearly equal: the corolla is compound radiate: corollules hermaphrodite, very many in the disk. Females the number of rays in the calyx, very long in the ray: proper, of the hermaphrodite tubular, semiquinquefid, the length of the calyx—of the female ligulate, very long, three-toothed, villose at the base, nerveless: the stamina consist of (hermaphrodite) five capillary filaments, very short: the anther cylindric, tubular, the length of the corollule: the pistillum hermaphrodite: germ oblong: style filiform, scarcely the length of the stamens: stigma obtuse, bifid, straight. Females: germ oblong, three-cornered: style filiform, the length of the stamens: stigmas two, oblong, acuminate, reflex. There is no pericarpium: the calyx is converging, roundish, and depressed: seeds hermaphrodite central of the disk none: of the circumference seldom solitary, membranous, obcordate, and compressed. Females solitary, larger, oblong, incurved, triangular, with membranous angles, marked on the outside longitudinally with the figure of a vegetable: there is no down: the receptacle is naked and flat.

The species cultivated for use and ornament are: 1. *C. officinalis*, Common Marigold; 2. *C. pluvialis*, Small Cape Marigold; 3. *C. hybrida*, Hybridous or Great Cape Marigold; 4. *C. nudicaulis*, Naked-stalked Cape Marigold; 5. *C. graminifolia*, Grass-leaved Perennial Cape Marigold; 6. *C. fruticosa*, Shrubby Marigold.

The first has a short divaricated stem, di-

viding low into numerous bushy branches a foot or two in height, pubescent and pale green, as well as the leaves; these are long, a little sinuated, the lower and middle ones ovate and blunt, the upper ones lanceolate; the flowers are radiated and of a golden colour, coming out at the ends of the branches. It is a native of France, flowering the greatest part of the summer, the flowers being open from nine in the morning to three in the afternoon.

There are varieties with single yellow flowers, with double yellow flowers; the great, with very double flowers, with single lemon-coloured flowers, with double lemon-coloured flowers, with single and double gold-coloured flowers, with parti-coloured flowers, with reflexed flowers, with proliferous or childing flowers.

The second species has an annual root; the lower leaves deeply indented on their edges, fleshy and of a pale green colour. The stems declining, from six to eight inches long, leafy to within two inches of the top; the stem-leaves much narrower and more indented than those at the root. The upper part of the stem very slender, upon which stands one flower, shaped like those of the common Marigold, having a purple bottom, with a ray of a violet colour on the outside, and of a pure white within: it opens when the sun shines, but shuts up in the evening, and remains so in cloudy weather. It is a native of the Cape, flowering from June to August.

The third has likewise an annual root; the leaves much longer than in the foregoing, and broader at the end; those near the root are regularly indented, but the stem-leaves have only a few shallow indentures. The stalks are much longer and thicker than those of the ensuing sort; and at the top, just below the flower, swell larger than at the bottom. The flowers are smaller than in the second, but of the same colour. It is a native of the Cape.

The fourth species is also an annual plant, and has much the appearance of the second, but the leaves are more deeply indented on their edges. The stalks grow about the same length as that, and are more naked: the flower is a little smaller, and the rays on the outside are of a fainter purple colour, but white within. It is a native of the Cape, flowering from June to August.

The fifth species is a perennial plant, which divides near the root into several tufted heads, closely covered with long grassy leaves coming out on every side without order; some of these have one or two indentures on their edges, but the most part are entire. From between the

leaves arise naked peduncles about nine inches long, sustaining one flower at the top, which is about the size of the common Marigold, having a purple bottom; the rays are also purple without, but of a pure white within. These expand when the sun shines, but always close in the evening and in cloudy weather. The general season of their beauty is in April and May; but there is commonly a succession of flowers late in the autumn, though not in so great plenty. It is a native of the Cape.

The sixth species has a slender shrubby stalk, rising to the height of seven or eight feet, but requiring support: it sends out a great number of weak branches from the bottom to the top, hanging downwards: the leaves are on short foot-stalks; most of them are slightly indented towards the top, but some are entire; they are of a shining green colour on their upper surface, but paler underneath: the flowers come out at the ends of the branches on short naked peduncles, and are in size and colour like those of the third sort. It is a native of the Cape, flowering during the summer months.

Culture.—The annual sorts may be increased by sowing the seeds in the spring in the borders or other parts where the plants are designed to remain, as they do not bear transplanting well, four or five seeds being put in each patch, which, when they all grow, should be thinned out to two plants in each patch. They afterwards only require to be kept clean from weeds. When the seeds are permitted to scatter, the plants appear more early in the following spring, and flower earlier than those sown at this season. As many of the sorts are liable to degenerate, as the Childing and the Large Double, where care is not taken in saving their seeds, the surest way to preserve the varieties is to pull up all those plants whose flowers are less double, as soon as they appear, and save seeds from the largest and most perfect flowers: the Childing variety should be sown by itself in a separate part of the garden, and the seeds saved from the large centre flowers only.

The fifth species may be raised either by seeds or slips taken from the heads. The first is, however, the best method, as they rarely produce good seeds in this climate. In the first mode, the seeds should be sown in the autumn on a bed of fine light mould, in a warm exposure, or in pots filled with the same. In the latter method, the slips may be planted any time in summer, in pots filled with light fresh earth, and plunged into a very moderate hot-bed, to forward their putting out roots; or the pots may be sunk in the ground up to their rims, and co-

vered with hand-glasses, which, in the middle of summer, answer well, but in the spring or autumn the former method is preferable. After planting, the glasses should be shaded in the heat of the day, and the slips frequently refreshed with water, but not given them too liberally, as much wet rots them. When they have got strong roots they should be planted separately in small pots filled with fresh light earth, and placed in a shady situation till fresh rooted, when they may be placed in the open air, in a sheltered situation, till autumn, and then removed into a dry airy glass-case, or green-house, for the winter season, or under a common hot-bed frame, as they only require protection from frost and wet.

The sixth species may be easily propagated by cuttings, which should be planted in summer in a shady border, or be shaded with mats in the heat of the day: when they have stricken good root they may be carefully taken up, put into separate pots filled with light, poor, sandy earth, and placed in the shade till again well rooted; then put with other hardy exotics in a sheltered situation till frosts appear, when they should be removed into the green-house, placing them so as to have free air.

The single-flowered common sorts are mostly cultivated as pot-herbs for the use of the flowers in broths, or as ornamental plants for the beauty of their flowers, which effect an agreeable diversity in the common borders of pleasure-grounds, in assemblage with other hardy annuals; and the third and fourth species may be made use of in the same way.

The two last sorts, from their continuing long in flower, also afford much variety when set out with other potted plants in the summer, and in the green-house in winter.

CALF'S-SNOUT. See **ANTIRRHINUM**.

CALLA, a genus containing a plant of the herbaceous flowery perennial green-house kind. *Æthiopian Arum*.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx is a one-leaved spathe, ovate-cordate acuminate, coloured at top, very large spreading, permanent: the spadix finger-shaped, quite single, erect, covered with fructifications: there is no corolla: the stamina consist of some filaments intermixed with the germs the length of the pistils, permanent, compressed, truncate: the anthers are simple, truncate, and sessile: the pistillum to each is a roundish obtuse germ: the style simple, very short: the stigma acute: the pericarpium contains as many berries as there

are pistils, four-cornered, globular, pulpy, and one-celled (several-celled): the seeds numerous (six to twelve), solitary, oblong, cylindric, and obtuse at both ends.

The species cultivated for ornament is *C. Æthiopica*, *Æthiopian Arum*, or Sweet Calla.

It has thick, fleshy, tuberous roots, which are covered with a thin brown skin, and strike down many strong fleshy fibres into the ground. The leaves arise in clusters, having foot-stalks more than a foot long, which are green and succulent: the leaves are eight or nine inches in length, and of a shining green, ending in a sharp point, which turns backward: between the leaves comes out the scape, which is thick, smooth, of the same colour as the leaves, rising above them, and terminated by a single flower shaped like those of the arum: the hood or spathe is twisted at the bottom, but spreads open at the top, and is of a pure white colour. In the centre of this is situated the spadix or club, which is of an herbaceous yellow colour, upon which the small herbaceous flowers are closely placed; it is only about half the length of the spathe; it is succeeded by roundish red berries. It is a native of the Cape.

Culture.—This plant is readily increased by offsets from the root, which should be separated in the autumn, and planted out singly in pots of light earth, where they become full plants the following year. The plants may be kept in the full air during the summer, but during the winter should have the protection of the green-house or a garden-frame.

These plants, from the singularity of their growth, and their being constantly furnished with leaves, have an agreeable effect, and produce much variety among other potted plants.

CALLICARPA, a genus containing a plant of the deciduous flowering shrubby kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters of which are: that the calyx is a one-leaved perianthium, bell-form: mouth four-cleft and erect: the corolla is monopetalous, tubular: border four-cleft, obtuse, spreading: the stamina consist of four filiform filaments, twice the length of the corolla: the anthers are ovate and incumbent: the pistillum is a roundish germ: the style filiform, thicker at top: the stigma thickish and obtuse: the pericarpium is a globular berry, smooth: the seeds four, oblong, shaped like a meniscus, compressed, calous.

The only species cultivated is the *C. Americana*.

This is a shrub from three or four to six feet in height; the branches rather compressed; the leaves serrate and acute; the nerves of the upper surface and the whole under surface tomentose; the flowers in axillary, dichotomous, tomentose panicles, scarce the length of the leaves; of a funnel-form and reddish colour, succeeded by a berry the size of a small pea, at first bright red, afterwards deep purple. It is a native of North America.

Culture.—This is easily increased from seeds by sowing them in pots, and plunging them in a moderate hot-bed; when the plants have obtained some strength, gradually inuring them to the open air, into which they may be removed in June, and placed in a sheltered situation till autumn, being kept clear from weeds, and gently refreshed with water in dry weather, but carefully placed under a frame on the approach of frosts, as they are readily destroyed by them.

CALTHA, a genus comprising a plant of the flowery perennial kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla consists of five petals, ovate, flat, spreading, deciduous, and large; the stamina have numerous filiform filaments, shorter than the corolla: the anthers compressed, obtuse, and erect: the pistillum a superior germ, five to ten, oblong, compressed, erect: no styles: the stigmas are simple: the pericarpium consists of many capsules, short, acuminate, spreading, one-celled, two-keeled, gaping in the superior suture: the seeds very many (fifteen), ovate or ovate-oblong, smooth, and affixed to the superior suture in a double row.

The only species is *C. palustris*, Marsh Marigold.

It has a perennial root; the stems are several, almost upright, about a foot high, hollow, nearly round, smooth, branched, and purple at bottom: the radical leaves stand on long petioles, cordate-reniform, smooth, shining, and notched or crenated, sometimes scalloped, sometimes entire: the stem-leaves nearly sessile, more pointed at top, and sharply crenated: the stipules are brown, membranous, and withering: the branches dichotomous, having one large bright-yellow flower at the top of each. It is a native of this climate, flowering in May.

There is a variety with double flowers, which is the sort cultivated for ornament.

The flowers gathered before they expand are said to be a good substitute for capers.

Culture.—This plant is propagated by parting

the roots in autumn, which should then be planted out in a moist soil and shady situation, good room being allowed. The double cultivated sort does not flower so early in the spring as the single, but continues much longer in beauty.

It affords variety in the fronts of beds or borders of pleasure-grounds.

CALYCANTHUS, a genus comprising a plant of the aromatic shrubby deciduous kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of the *Rosaceæ*.

The characters of which are: that the calyx is a one-leaved, pitcher-shaped, squarrose perianthium: leaflets coloured, lanceolate; the superior ones gradually larger, resembling petals: there is no corolla, except the calycine folioles, representing petals: the stamina consist of numerous subulate filaments, inserted into the neck of the calyx: the anthers oblong, furrowed, growing to the top of the filaments: the pistillum consists of a great many germs, ending in subulate compressed styles of the length of the stamens: the stigmas are glandulous: there is no pericarpium, the calyx being thickened, obovate, and berried: the seeds are very many and tailed.

The only species cultivated is *C. floridus*, Carolina All-spice.

It rises to the height of eight or ten feet where it grows naturally, but seldom more than four feet high in this country, dividing into many slender branches near the ground; covered with a brown aromatic bark, with two entire leaves placed opposite at every joint on short foot-stalks: the flowers grow single on short peduncles at the extremity of the branches; they have two series of narrow thick petals, which spread open, and turn inward at the top, like those of the starry anemone; these are of a dusky purple colour, and have a disagreeable scent. They appear in May. The strong aromatic scent has obtained it the title of All-spice.

There are varieties with long leaves and with round leaves.

Culture.—This is increased by laying down the young branches, or one-year's shoots, which may be taken off in a twelvemonth, and set where they are to remain, as they do not bear transplanting well afterwards. The effects of drying winds should be guarded against in the summer, and frosts in winter; the former by very moderate waterings, and the latter by coverings of bark. The best season for laying down is the autumn, and for planting out, the spring.

This shrub is capable of bearing the open air, but requires a dry soil and warm exposure.

It is very ornamental in the fore parts of clumps

or borders in shrubbery and other ornamented grounds.

CAMELLIA, a genus comprising a plant of the large evergreen exotic kind for the greenhouse.

It belongs to the class and order *Monadelphica Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a many-leaved perianthium, roundish, imbricate; the scales roundish, very blunt, the inner ones gradually larger, concave, and deciduous: the corolla consists of five petals, obovate, coalescing at the base: the stamina have numerous erect filaments, coalescing below into a crown larger than the style, above unconnected, shorter than the corolla: the anthers are simple: the pistillum is a roundish germ: the style is subulate, the length of the stamens: the stigma acute and reflex: the pericarpium is a turbinate woody capsule, marked with some furrows: the seeds are kernels, equal in number to the streaks of the capsule, roundish, and often filled with smaller seeds.

The species cultivated is *C. Japonica*, Japan Rose.

It has a tree-like stem, branching upwards to a considerable height in its native situation: the bark is ash-coloured; branches round and smooth: the leaves are alternate, ovate, evergreen, shining on both sides, thick and stiff, paler green beneath, on short petioles: the flowers coming out from the sides of the branches are large, spreading, and roseaceous, being succeeded by a ligneous capsule inclosing a sort of nut.

There are varieties with single red and purple flowers, with double red and purple flowers, with single white flowers, and with double white flowers.

It is in high estimation with the Japanese for the elegance of its large flowers, which exhibit a great variety of colours, but have no scent, as well as for its evergreen leaves. It flowers in its native climate from October to April, and is also a native of China.

Culture.—It is capable of being increased both by layers and cuttings, but the former is the best method. The branches may be laid down in the autumn, and be taken off in the May following, and planted out in pots, which should be plunged in a moderate hotbed.

In the latter mode the young shoots may be cut in the early spring, and planted in pots of light earth, plunging them in a slight hotbed.

When planted out in the open ground it should have a warm southern aspect against a wall,

and be well protected from frosts during the winter.

CAMOMILE. See **ANTHEMIS**.

CAMPANULA, a genus comprising various plants of the annual, biennial, and perennial herbaceous flowery kind. The Bell-flower.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceae*.

The characters are: that the calyx is a five-parted perianthium, acute, erect-expanding, superior: the corolla is monopetalous, bell-form, impervious at the base, half-five-cleft, marcescent: divisions broad, acute, spreading: the nectary in the bottom of the corolla, composed of five valves, acute, converging, covering the receptacle: the stamina consist of five capillary filaments, very short, inserted on the tips of the valves of the nectary: the anthers are longer than the filaments, and compressed: the pistillum is an angular inferior germ: the style filiform, longer than the stamens: the stigma three-parted, oblong, thickish: divisions revolute: the pericarpium is a roundish angular capsule, three- or five-celled, emitting the seeds at so many lateral openings: the seeds are numerous and small: the receptacle is columnar and adnate.

The species mostly cultivated for the purposes of ornament and use are: 1. *C. persicifolia*, Peach-leaved Bell-flower; 2. *C. pyramidalis*, Pyramidal or Steeple Bell-flower; 3. *C. Carpathica*, Carpathian or Heart-leaved Bell-flower; 4. *C. latifolia*, Broad-leaved Campanula, or Giant Throat-wort; 5. *C. Trachelium*, Great Throat-wort, or Nettle-leaved Campanula; 6. *C. grandiflora*, Great-flowered Bell-flower; 7. *C. medium*, Small Pyramidal Campanula, or Canterbury Bells; 8. *C. Speculum*, Venus's Looking-glass; 9. *C. Americana*, American Bell-flower; 10. *C. fruticosa*, Shrubby Cape Bell-flower; 11. *C. Rapunculus*, Esculent Rampion.

There are other species in this extensive genus deserving of attention.

The first has the root like that of Navew, and eatable: the stem is very straight, eighteen inches high and more, (in gardens two feet and a half,) unbranched, angular, smooth, as is the whole plant: the flowers are in a thin spike, one or two together, on very long peduncles, which have two stipules at the base: the corolla is large, broad bell-form, deep blue; the segments short, and moderately acuminate. It is a perennial plant, native of most parts of the continent of Europe, flowering in June and July.

There are varieties with single blue and white flowers, and with double blue and white flowers.

The second species, as it appears in the gar-

den, has thick tuberous roots, which are milky; these send out three or four strong, smooth, upright stalks, which rise near four feet high, and are garnished with smooth oblong leaves, whose edges are a little indented: the lower leaves are much broader than those on the stalks: the flowers are produced from the side of the stalks, and are regularly set on for more than half their length, forming a sort of pyramid; these are large, open, and shaped like a bell, and mostly of a light-blue colour.

There are varieties with white flowers and with double flowers.

The third affords a milky juice when wounded: the root is whitish and perennial; the stems herbaceous, annual, weak, hardly branching, bearing one or very few flowers. In gardens it becomes branching and many-flowered. The root-leaves are kidney-form, roundish; the peduncle elongated and smooth; the corolla blue. It flowers the whole summer, and is a native of the Carpathian Alps.

According to Mr. Curtis, it is still scarce in gardens, but deserves to be more known and cultivated: its flowers are in proportion to the plant, being large and showy.

The fourth species has the stem three feet high and more, angular and smooth, but not branching: the leaves are sharply serrate, on short petioles, and hirsute: the flowers are axillary, one or two together, on peduncles shorter than the leaf: calyx smooth, with broad triangular segments: corolla very large, blue; the segments triangular, divided by a line: the fruit obliges the peduncle to bend down with its weight. It is a native of the northern parts of the island, flowering in July.

There are varieties with single and double purple, and with single and double white flowers; with single and double pale-red flowers; and with striped flowers.

The fifth species has a perennial root: the stems are from two to three feet in height, upright, stiff, hairy, angular; the angles membranaceous, putting out a few short side-branches: the leaves resembling those of the great nettle, but rather shorter and broader, alternate, ovate, cordate, pointed, hairy, deeply toothed, sometimes having two or three lobes; petioled, except the upper ones, which are sessile: the peduncles are alternate, axillary, trifid, and three-flowered. The number of flowers, however, varies from one or two to three, four, and even five; they are large and nodding. It is a native of most parts of Europe, &c. flowering in July and August.

There are varieties, with single and double blue flowers, with single and double white

flowers, and with single and double pale purple flowers.

The sixth species has the whole plant very smooth; the root perennial, white, fusiform, the thickness of a finger, and branched; the stems are few, erect or ascending, simple, round, a foot high, leafy all over, annual, terminated with one handsome flower, but without scent, nodding a little, with sometimes one or two flowers more from the upper axillas: the leaves are irregularly scattered, sessile or on very short petioles, ovate or sub lanceolate, short and sharply serrate: sometimes a few of the leaves, and at others all of them, are in threes: the corolla is two inches in diameter or more, very deep blue, with numerous blue veins; elegantly pear-shaped before expanding, and at first green. It flowers in June and beginning of July, and is a native of Siberia.

The seventh has a biennial root: the leaves are oblong, rough, hairy, serrate, coming out without order from the root, narrowing into a petiole. From the centre of these, the second season, arises a stiff, hairy, furrowed stalk about two feet high, sending out several lateral branches, with long, narrow, hairy, serrate, sessile leaves, placed alternately: from the setting on of these leaves come out the peduncles, those on the lower part of the stem and branches four or five inches long, diminishing gradually in length upwards, and thus forming a sort of pyramid. The flowers are very large, and make a fine appearance; they are smooth, and the segments turn back at the end; they come out the beginning of June, and, if the season be not very hot, continue a month in beauty. It grows naturally in Germany, &c.

There are varieties, with blue, purple, white, striped, and double flowers.

The eighth species is an annual plant, which rises with slender stalks a foot high: the flowers are of a beautiful purple, inclining to a violet colour, (sometimes pale purple or white,) and in the evening fold up into a pentagon figure, whence it is sometimes called *Viola pentagonia*: the calyx is composed of five narrow leaves, which spread open, turn back, and are much longer than the petals; these remain on the top of the prismatic seed-vessel, which is filled with small angular seeds: the stem is tender, quadrangular, naturally procumbent, branched from the bottom at very great angles: the leaves sessile, obovate, and waved about the edge: the flowers axillary, erect, on very long peduncles: the corolla wheel-shaped, and so deeply five-cleft that the segments, which are ovate, scarcely cohere.

It is a native of the southern countries of Europe, flowering from May to September.

There are varieties, with bright blue flowers, with white flowers, and with pale purple flowers.

The ninth species has an annual root; the stem and germs smooth; the leaves acuminate; the flowers three or more from each axil or bracte; the corollas small; the style longer than the corolla. It is a native of Pennsylvania, flowering in July.

There are varieties, with single white, with single blue, and with double blue flowers.

The tenth is a shrubby ornamental plant, a native of the Cape of Good Hope, flowering here in August.

In the eleventh species the whole plant is full of a milky juice: the root is biennial, spindle-shaped, sometimes branching: the stem upright, angular, two feet high, hairy towards the base, smooth above: branches alternate, short, upright: the leaves towards the base of the stem hairy above or on both sides, blunt; the upper ones smooth, and becoming gradually more pointed; obscurely notched: teeth glandular, whitish, not projecting beyond the edge of the leaf: there is an awl-shaped bracte at the base of each peduncle: the segments of the calyx are awl-shaped, or setaceous, twice as long as the germ, with a small tooth on each side of the base: the flowers are upright: the corolla blueish purple, sometimes very pale purple or whitish; each segment marked with three lines: the nectary fringed. It grows wild in France, &c., flowering in June, July, and August.

The fleshy roots are eatable, and are much cultivated in France for sallads.

Culture.—The plants in this extensive genus are mostly hardy, and increased with little difficulty. The six first sorts, and their varieties, are all capable of being raised by dividing the roots in the autumn or early spring, and planting them out on the beds, borders, or other parts. The former is, however, the better season for the purpose, as the roots become better established before they begin to shoot up into stem. They thrive in almost any soil or situation. As the plants of the steeple bell-flower, trained for adorning halls and chimneys, are seldom proper for the purpose the following season after being planted out, a supply of young plants should be annually raised. And though this is mostly done by offsets, as being the quickest mode, the plants raised from seeds are always stronger; the stalks rise higher, and produce a greater number of flowers, especially where good seeds can be procured.

In the fifth sort, especially with the double varieties, the parting their roots should be an-

nually performed in the autumn, otherwise the plants are apt to degenerate to single, and the soil should not be too light or rich in which they are planted, as in either of these cases they degenerate. In a strong fresh loam their flowers are in the greatest perfection.

The broad-leaved sort is also easily propagated by seeds, which it furnishes in great plenty.

In all these sorts, when not sown in the places where they are to remain, the plants should be transplanted into such situations, in the beginning of the autumn, as by that means they flower much better.

The seventh and eighth kinds are increased by seeds, which should be sown in the spring, on beds of common earth, keeping them clean from weeds till the following autumn; when they may be transplanted into the borders or other parts. And as the plants in the first of these sorts perish the second year, young ones should be annually raised.

The latter of these kinds are mostly sown in patches in the borders or clumps, among other hardy annuals, at the above period; but if sown in autumn the plants grow much taller, and flower much earlier.

The ninth sort is propagated by planting the offsets from the roots in the beginning of the autumn, in beds, or other places, where they are to remain. And the tenth species may be increased by planting the cuttings of the shoots in pots of light earth, and plunging them in the hotbed of the stove.

The eleventh kind is raised from seed, which should be sown in April in a moist shady situation, the plants being thinned out to five or six inches distance. The roots are ready for use about the beginning of autumn. It requires to be sown annually.

All the hardy flowering sorts are highly ornamental in the borders of pleasure-grounds and other parts, as they continue long in flower. And the tender kinds afford variety in the greenhouse.

CAMPION. See AGROSTEMMA.

CANARINA, a genus containing a plant of the exotic greenhouse kind. The Canary Bell-flower.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Campanaceae*.

The characters are: that the calyx is a superior perianthium: leaflets six, lanceolate, recurved and permanent: the corolla is monopetalous, bell-form, six-cleft, nerved: the nectary of six valves, equal, distant, covering the receptacle: the stamina have six subulate filaments, spreading outwards, originating from the valves:

the anthers are pendulous from the tip: the pistillum is an inferior, six-cornered germ: the style conical and short: the stigma longer than the stamens, clavated, six-cleft: the pericarpium is a six-angled, obtuse, six-celled capsule: the seeds are numerous and small.

There is only one species introduced into cultivation, *C. campanulata*, Canary Bell-flower.

It has a perennial root, tuberous-fusiform; the stem is three feet high, erect, solitary, round, even with swelling joints: the branches by three from each joint; the upper ones longer, dichotomous at the end, with alternate branchlets; the leaves on the stem in threes, on the branches opposite, petioled, hastate, toothletted and even, veined: the flowers proceed from the forks of the upper branches solitary, peduncled and drooping: the corolla is larger than the leaves, resembling that of crown imperial, rufous, brighter within, with a yellow eye; each segment with three purple nerves. It is a native of the Canary islands, flowering from January to March.

Culture.—It is capable of being increased by parting the roots with caution not to break them, as, when this happens, a milky juice exudes, and renders them liable to rot. In such cases they should be laid in the greenhouse a few days to heal. The roots must not be too often parted, as it weakens the plants, and prevents them from flowering well. The best time for this is in July, soon after the stalks decay. The earth, in which they are planted, should not be rich, as that will render the plants too luxuriant in branches, but poor in flowers: they succeed best in a light sandy loam, with a fourth part of screened lime-rubbish. It requires the protection of a greenhouse in the winter, and the assistance of occasional slight waterings, but only shade in the spring season when set abroad. It has a fine effect when in the greenhouse, or in assemblage with other plants in full flower.

CANDLEBERRY TREE. See MYRICA.

CANDY-TUFT. See IBERIS.

CANE. See ARUNDO.

CANELLA, a genus affording a plant of the exotic tree kind, for the stove.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of the *Meliæ*.

The characters are; that the calyx is a one-leaved, three-lobed perianthium, the lobes roundish, and concave: the corolla has five petals, oblong, sessile, longer than the calyx, two a little narrower than the rest: the nectary

pitcher-shaped, the length of the petals, and anther-bearing: the stamina have no filaments: the anthers are twenty-one, linear, parallel, distinct, fastened on the outside to the nectary: the pistillum is a superior germ, within the nectary, ovate: the style cylindric, the length of the nectary: the stigmas two, blunt, convex, and wrinkled: the pericarpium is an oblong berry, three-celled: the seeds roundish-kidney-shape (two to four), in pairs, cordate.

There is only one species, *C. alba*, Laurel-leaved Canella, or White Cinnamon.

In its native situation it is a tree, the stem of which rises from ten to fifty feet in height, very straight and upright, being branched only at the top, but here only a shrub: the bark is whitish, by which it is easily known; the branches are erect, and not spreading: the leaves are petioled, alternate, but not regularly, oblong, pointed, entire, without any distinct nerves or veins, dark green, of a thick consistence like those of laurel, and shining: the flowers grow at the tops of the branches in clusters, but upon divided peduncles, are small, seldom open, and of a violet colour; they are succeeded by a fleshy, smooth, black berry.

It is a native of the West-Indies, and the whole tree is very aromatic, when in blossom perfuming the air all around.

Culture.—This plant is best raised by sowing the seeds procured from its native situation, in pots, in the autumn or spring seasons, and plunging them in a moderate hot-bed of bark; being sparingly watered in winter, but more freely in the summer season, and air freely admitted in mild warm weather. In this way the plants often succeed very well. They seldom take well by either layers or cuttings.

They require to be constantly kept in the bark-bed of the stove.

CANKER, a disease with which fruit- and forest-trees are liable to be attacked. It is a sort of vegetable gangrene, by which the bark becomes rough and scabby, and the affected woody part of a brown rusty colour. It ultimately destroys the trees, when not removed by proper means.

It has been suggested by Mr. Knight as being more liable to attack such trees as have been propagated for a great length of time by ingrafting, as being continuations of the old trees, only nourished by new stocks; and of course to be a disease of old age, somewhat similar to that of mortification in the extremities of persons in the decline of life. The author of the *Philosophy of Gardening*, however, considers it as more probable to be a hereditary

disease, from the buds of trees being a lateral progeny, and consequently having a more exact resemblance to their parents, being thereby "more liable to the diseases gradually acquired or increased by the influence of soil or climate;" not having the probability of improvement, as in those propagated in other modes.

The disease is, however, capable of being produced in other ways. It is very apt to be induced in different sorts of trees by the destruction of the bark, by external violence, as a blow of the spade where digging is performed without sufficient caution.

In apple-trees Mr. Forsyth has found it very liable to be caused by the want of due attention in pruning, the leaving of the foot-stalks of the fruit on the trees; and certainly by the bruises produced by ladders in gathering the fruit. Too tight nailing, from the pressure of the shreds on the shoots. The wetness of the autumn season, by preventing the young wood from becoming well ripened, when succeeded by sharp frost, often produces the disease, from the young shoot being destroyed and left on the trees. Their being left in this way has likewise much tendency to promote its increase. It is also suggested that the buds' being eaten and destroyed by birds or insects produces the same consequences.

Mr. Forsyth well remarks, that by leaving the dead wood on the trees during the summer, the disease is infallibly brought on; and that when it is continued for years they are wholly destroyed. He advises their being cut off the latter end of April, or in the following month, when their progress can be ascertained, and to perform the operation three, four, or more buds below the seemingly diseased part, as the affection often extends much further in the heart of the shoot, than it seems to do on the outside. The cutting should be carried so far down that the rusty colour disappears, and there is only the sound white wood.

Some contend that this disease is produced in all sorts of trees, solely by the quality of the soil, as where it is of the sour clayey, shingly, or gravelly kind; but Mr. Forsyth found that in these, though he allows that fruit-trees succeed best in mellow loams, the roots were not in the least affected where the branches were very greatly diseased. It is asserted that the canker constantly proceeds from the branches and stem to the roots, but never in the contrary direction.

When trees are very much affected in consequence of large wounds, it is advised, by the above writer, to pare off all the infected parts of

the bark with a draw-knife; and as the inner white bark is frequently diseased, having a dotted appearance, it should likewise be wholly removed, as, when any is left, it extends itself afresh. And when the trunk is become hollow it is recommended to round out the decayed parts, and then to apply the composition which he has recommended in a liquid state, with a brush, over the parts from which the cankered bark or dead wood has been removed, shaking the powder of wood-ashes and burnt bones over it. In this way the disease will soon be removed, and the hollow trunk in time filled up.

But when the stem is greatly decayed it is necessary to open the earth, and remove all the rotten parts completely; then filling up the parts with a mixture of the composition and clay, as used in grafting, to within a few inches of the surface ground, forcing it well in by treading, the surface being made sloping from the tree, to convey off the wet. The whole should then be made level with mould.

After having managed the old wounded parts in this way, the old bark is advised to be examined, and, when found wrinkled or cracked, on the outside, pared off with a draw-knife, and the composition applied as above; which produces a fine smooth bark underneath it, the plaster with the old bark peeling off in the succeeding winter or spring; at this time, all the old bark remaining in the hollows, being removed by a wooden or bone knife. After this, the parts from which the bark has been scraped off should be thinly coated over with a liquid composed of cow-dung, soap-suds, and urine. This remains till the new bark is formed, when it is discharged of itself, during the summer or following spring, leaving a fine new smooth bark. The same operation may be repeated in the ensuing spring if there should be occasion; by which the whole of the old diseased bark may be sloughed off, and the tree kept in a fine healthy state and perfect order.

In the prevention of this vegetable affection, much care is necessary in the pruning and other management of the trees. All the ends of diseased shoots should invariably be removed, as well as the old fruit-stalks and dead stubs cut away. The appearance of gum on the stems, or branches of trees indicates their being attacked with the canker.

Common white paint is sometimes made use of as an application for the removal of canker. When this substance is employed, Dr. Darwin has suggested that it may probably be rendered more destructive to insects,

pod; with heart-shaped upright pod; with round, heart-shaped, upright pod; and with very large, roundish, upright pod.

In the Angular-heart-formed kind, with upright, angular, heart-shaped, furrowed and wrinkled scarlet pod; with upright, angular, heart-shaped, flat-topped, scarlet pod; and with upright, angular, bell-shaped scarlet pod.

And in the Great Angular Pickling kind, there are varieties with upright, swelling, fleshy-skinned, wrinkled red pod, flattened and angular at top; and with hanging or pendulous pod.

The Cherry-fruited variety has low spreading branches, leaves in clusters, and round, smooth, red, cherry-shaped fruit.

And the Olive-shaped variety has an erect branchy head, and olive-shaped fruit.

The second species has much resemblance to the annual kind, and seems to be the connecting link between the herbaceous and shrubby sorts; the stem is perennial, a span in height, and somewhat branching; the fruit, in proportion to the plant, is very large, being almost as big as an apple, but differing in shape; it is solitary and erect, from an inch and half to two inches long, swelling and wrinkled, flattened and angular at top.

The third differs but little from the fourth; the stem is more tender, more shrubby, and not roughish; the berries are very small, red, of an ovate form, and of the size of currants; the branches are divaricated, not spreading out at a right angle with the stem. It is a native of the West Indies.

It is gathered when ripe; and, after being dried and pounded, constitutes Cayenne Pepper.

The fourth species has the stem three feet high and rugged; branches diffused, frequently scandent; the leaves are lanceolate, quite entire, waved, small, smooth, petioled, alternate, or scattered: the flowers are axillary, small, white, five- or six-cleft: the fruit is at first green, but, when ripe, golden- or saffron-coloured, crooked, and shaped like a horn, an inch long, and usually solitary.

Culture.—They are all capable of being easily raised from seed on a hotbed in the early spring months, which, after it has been prepared, should have the glasses put on, and five or six inches depth of rich light earth laid over the surface; the seed should then either be sown over it in small drills, or in pots plunged in the mould, in the first mode covering it in about a quarter of an inch deep: when the plants appear air should be given daily by tilting up the lights, as well as frequent moderate waterings; and when two or three inches high, and they have three or four leaves, it is of advantage to

prick a quantity of them out upon another hotbed, at from four to six inches distance, giving water and shade occasionally till rooted; after which air should be freely admitted every fine day, and moderate waterings two or three times a week, hardening the plants gradually to the full air, into which they should be removed the beginning of June, with a ball of earth to each root, placing them in different parts of the flower-borders, either in the full ground or in pots, watering them in dry weather till they have taken good root. Such as are intended to produce fruit for pickling should be planted out in a rich warm border, or other place, in the kitchen-garden, in rows a foot and a half or two feet distant, and at about fifteen inches distant in the rows, water being given as before.

The shrubby sorts, after being raised from seeds, as above, should be pricked out singly in small pots, and plunged into another hotbed, under frames and glasses, air and water being given; and when they are considerably advanced in growth, removed, with balls to their roots, into larger pots, &c. plunging them in a bed of moderate warmth under a deep frame, where they may remain to have occasional shelter till autumn; then they must be taken in their pots to the stove, where the fruit has a fine appearance in the winter.

The annual kinds are considered not only as plants of ornament, from their flowers; but the beauty of the ripe fruit, which, from being numerous, and of various forms, sizes, positions of growth, and colours, blended with the green leaves and the white flowers, have a fine effect in the latter part of summer, either in the borders and clumps in open places, or in pots in fore-courts and other compartments about the house.

For useful purposes the young or half-grown fruit is esteemed as a fine pickle; all the sorts may be used for this purpose, but the great angular-podded kind, or Bell Pepper, should be preferred.

The shrubby sorts, as just observed, have a fine effect in the autumn and winter in the stove, from their ripe fruit, which often remains on the plants till the approach of spring.

CARAWAY. See CARUS.

CARDAMOMUM. See AMOMUM.

CARDINAL-FLOWER. See LOBELIA.

CARDOON. See CYNARA.

CARICA, a genus comprising plants of the curious exotic hothouse kind. The Papaw Tree.

It belongs to the class and order *Diœcia Decandria*, or rather *Polygamia*, and ranks in the natural order of *Tricocœæ*.

The characters of which are: that in the male the calyx is scarce manifest; it has, however,

five very short sharp teeth: the corolla is monopetalous, funnel-form: the tube slender, very long, gradually slenderer downwards: the border five-parted, divisions lanceolate-linear, obtuse, obliquely and spirally revolute: the stamina consist of ten filaments, in the top of the tube of the corolla; the five alternate ones inferior: the anthers are oblong, fixed to the filaments on the inner side.

In the female, or rather the hermaphrodite, the calyx is a very small, five-toothed, permanent perianthium: the teeth ovate, acute, spreading: the corolla is five-parted; parts lanceolate, sharp, erect below the middle, but reflected and twisted above: the stamina consist of ten filaments, five alternate, shorter, subulate, all united by a membrane at the base: the anthers are ovate, erect, two-valved, and fertile: the germ ovate: there is no style: the stigmas three or five, broad, flat-expanding, multifid: the segments very short and blunt: the pericarpium is a very large berry, angulated with three or five furrows, unilocular, and fleshy: the seeds are numerous, ovate, green, very smooth, tunicated, nestling in the middle of the berry.

The species are: 1. *C. papaya*, Common Papaw Tree; 2. *C. posoposa*, Dwarf Papaw Tree.

The first rises with a thick, soft, herbaceous stem, to the height of eighteen or twenty feet in its native situation, naked till within two or three feet of the top, and having marks of the fallen leaves great part of its length: the leaves come out on every side the stem upon very long foot-stalks; those which are situated undermost are almost horizontal, but those on the top are erect: these leaves (in full-grown plants) are very large, and divided into many parts (or lobes) which are deeply sinuated, or cut into irregular divisions. The stem of the plant, and also the foot-stalks of the leaves, are hollow in the middle. The flowers of the male are produced from between the leaves on the upper part of the plant on every side; they have peduncles near two feet long, at the ends of which the flowers stand in loose clusters, each having a separate short pedicel; these are of a pure white, and have an agreeable odour. Sometimes these are succeeded by small fruit, about the size and shape of a Catherine Pear. The flowers of the female Papaw also come out between the leaves, toward the upper part of the plant, upon very short peduncles, singly, sitting close to the stem; they are large and bell-shaped, composed of six petals, which are commonly yellow, but those of the pyramidal sort purple: when these fall away, the germ swells to a large-fleshy fruit, the size of a small melon, of different forms, some being angular, and compressed at both

ends; others oval and globular, and some pyramidal. The fruit, when half ripe, is here sometimes used as a pickle instead of mango; and the tender foot-stalks of the female tree preserved as a sweetmeat.

It is a native of America.

There are varieties in the female, with melon-shaped fruit, with gourd-shaped fruit, with pear-shaped fruit, and with pyramidal fruit.

The second species, according to Brown, seldom rises above four or five feet in height. It differs from the other in having a branching stalk, the lobes or divisions of the leaves being entire, and in the fruit being shaped like a pear; of different sizes; yellow within and without, and of a sweet flavour; the flower of a rose-colour, and divided only into five parts.

Culture.—These plants are easily increased by seeds, which should be sown on a hotbed early in the spring; and when the plants are about two inches high, removed into separate small pots filled with light, mellow, loamy soil, being plunged into a bark hotbed, carefully shading them till they have taken root.

In the autumn they should be placed in the stove, but little water given during the winter, as they are apt to be injured by moisture. Great care is also necessary, in shifting them from small pots into larger ones, to preserve the whole ball of earth to their roots; as, when they are left bare, they rarely survive. As the plants advance in growth they must be removed into larger pots.

These are very ornamental plants in the stove at almost all seasons, but the fruit seldom ripens so fully as to be eaten.

CARNATION. See DIANTHUS.

CAROB-TREE. See CERATONIA.

CAROTA. See DAUCUS.

CARPINUS, a genus furnishing plants of the hardy deciduous forest-tree kind. The Hornbeam.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the male flowers are disposed in a cylindric ament: the calyx is a common ament, on all sides loosely imbricate, consisting of scales, ovate, concave, acute, ciliate, uniflorous: there is no corolla: the stamina consist of, generally, ten very small filaments: the anthers are didymous, compressed, villose at the tip, and bivalve.

The female flowers are disposed in a long ament, upon the same plant: the calyx is a common loosely imbricate ament, consisting of lanceolate scales, which are villose, reflected at the tip, and uniflorous: the corolla is calyciform,

monophyllous, six-cleft; two of the divisions larger than the rest: the pistillum consists of two germs, very short, two styles on each, capillary, coloured, long: the stigmas simple: no pericarpium: the ament becoming very large, concealing the seed at the base of each scale: the seed is a nut, ovate and angular.

The species are: 1. *C. Betulus*, Common Hornbeam; 2. *C. Ostrya*, Hop Hornbeam; 3. *C. Virginiana*, Flowering Virginian Hornbeam.

The first rises with a straight upright stem to a considerable height, feathered from the bottom, and terminating in a branching bushy head: the leaves are ovate, acuminate, sharply serrate, strongly nerved, bright-green, smooth, three inches or more in length, and near two in breadth, standing on round petioles, slightly pubescent, half an inch in length, and having ovate red glandules at their base. They begin to open about the end of March, and are usually quite out by the middle of April. They wither in autumn, but remain on the branches till spring. This has lately been considered chiefly as a shrub, and cultivated for under-wood, and in the nurseries for planting as hedges.

There are varieties, with pale-green leaves, with variegated leaves, with cut leaves, and the Oriental Hornbeam.

The second species rises with an upright stem twenty feet in height, terminating in a rough head: the leaves are elliptic, acuminate, doubly-toothed, nerved, the nerves ferruginous. The female fruits resemble hops, but are formed of inflated scales, closed on every side, villose at the base, including a bilocular seed.

It sheds its leaves in winter, with the elm and other deciduous trees. It was first observed in Italy, and is very common in Germany. This is of quicker growth than the common sort.

The third grows to the height of thirty feet or more, with an upright stem, and is of quicker growth than either of the former sorts; it sheds its leaves, which are spear-shaped, pointed, and rough, in autumn, about the same time with the elm; and during the time of its verdure makes a good appearance, being well clothed with leaves, which are of a deep, strong, green colour, resembling the long-leaved elm.

Culture.—All the sorts may be raised from seed sown in autumn, in beds, covering it an inch deep: the plants sometimes rise in the spring, and sometimes not till the spring following; the seeds may likewise be preserved till the beginning of the year, and then sown in February. When the plants have had two years' growth in the seed-bed, they should be planted out in the nursery, in rows two feet and half distant, and eighteen inches in the rows, keeping them

clean; and when from three to six or eight feet high they are fit for being finally planted.

They are also capable of being raised by layers laid down in autumn, which in twelve months will be ready to take off and plant out. This is the best way to continue the different varieties distinct; but for timber-trees the new method is the best, as the trees continue longer.

All these are hardy trees, and will prosper in almost any soil or exposure.

The first kind flourishes not only in good but any hungry barren soil, light or stiff, and in hilly, bleak, exposed places. It may also be planted as a forest tree, for ornament in parks, either singly, in clumps, or large plantations, in assemblage with others of the deciduous kind; and as it retains its leaves, in a withered state, during the winter, it affords shelter to less hardy trees, and is, of course, adapted to border plantations. It is likewise well adapted for hedges, either by way of ornament or shelter, as it is feathered to the bottom, and capable of being readily trained. And the other sorts are proper for large ornamental plantations to increase the variety and effect: the oriental kind is well adapted for low close hedges.

CARROT. See *DAUCUS*.

CARTHAMUS, a genus comprehending plants of the annual and perennial herbaceous flowery kind.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ*.

The characters are: that the calyx is common ovate, imbricate; scales numerous, contracted below, increased at the tip by a foliaceous appendicle, which is subovate, flat, spreading, obtuse: the corolla is compound uniform, tubular; corollets hermaphrodite, equal; the proper one monopetalous, funnel-form; border five-parted, erect, subequal: the stamina consist of five capillary filaments, very short: the anthers are cylindric and tubular: the pistillum is a very short germ: the style filiform, longer than the stamens: the stigma simple: there is no pericarpium: the calyx converging: the seeds are solitary: the receptacle is flat, pilose, hairs longer than the seed.

The species are: 1. *C. lanatus*, Yellow Distaff Thistle, or Woolly Carthamus; 2. *C. coeruleus*, Blue-flowered Carthamus, or Bastard Saffron; 3. *C. Tingitanus*, Tangier Carthamus; 4. *C. arborescens*, Tree Carthamus.

The first is an annual plant, perishing soon after the seeds are ripe: the lower leaves sprout flat upon the ground; these are five or six inches long, narrow, and deeply indented on both sides; they are hairy, and have a few soft spines on

their edges: the stalk rises about two feet high, covered with hairs, and garnished with oblong hairy leaves, which embrace it, and are deeply sinuated, with sharp thorns growing on their edges; the upper part divides into many branches, which have leaves of the same form, but smaller: the flowers are produced at the end of the branches, having a cluster of stiff, hard, prickly leaves below the scaly calyx, which contains many yellow florets, succeeded by oblong angular seeds. It flowers in June and July, and is a native of the South of France, &c.

The second species rises with a single stalk about two feet high, of a purplish colour, hairy and channelled, closely beset with broad spear-shaped leaves, sharply serrate, and covered with a short hairy down: the stalk is terminated by a single large head of blue flowers, having a scaly calyx composed of two orders of leaves; the outer broad, long, and armed with sharp spines on their edges; the inner narrow, and terminated by a sharp thorn. It flowers in June and July, and grows naturally in Spain, &c.

The third has a perennial root: the stalk rises about a foot and a half high, seldom putting out any branches: the leaves the whole length of the stalk are narrow, spear-shaped, deeply serrate, each of the serratures ending in a sharp point; those next the root being entirely pinnate, but the stem-leaves pinnatifid: the stalk is terminated by one large scaly head of blue flowers. It is a native of Barbary.

In the fourth species the whole plant is pubescent; the stem firm, from eight to ten feet in height, and evergreen: the leaves are stem-clasping, ensiform or lanceolate, a foot long, pinnatifid-sinuate, toothed, mostly spinous at the end, with a white rib: the flower is terminal, one or two, sessile, yellow, and sweet-smelling. It is a native of Andalusia.

Culture.—The first sort may be increased by sowing the seeds in the autumn in any open situation; these plants require no further culture but to keep them clean from weeds, and sufficiently thin.

The second and third sorts may be propagated by parting the roots, which for the former should be performed in autumn, when the leaves decay. In a light soil it endures the cold of our winters, and continues many years: it may also be raised from seeds, as in the first, which ripen in this climate in dry seasons. For the latter, the best time is about the beginning of March. It should have a dry soil and a warm situation, otherwise it is very liable to be destroyed in severe winters.

The last sort, as it does not ripen seeds in this climate, is only capable of being increased by

side-shoots slipped from the branches in the spring, and planted in pots filled with light sandy earth, plunging them into a moderate hotbed, and shading them till they have taken root; they should then be gradually hardened, and removed into the open air, and when sufficiently strong, some planted in a warm dry border, and others in pots, to be sheltered in winter from frost.

These plants have a good effect in mixture with others of the flower kind in borders and clumps.

CARUI. See CARUM.

CARUM, a genus containing a plant of the biennial herbaceous aromatic kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal long umbel: rays ten, frequently unequal: umbel partial crowded: involucre universal, often monophyllous; partial none: the perianth scarcely manifest: the corolla is universal uniform: the florets of the disk abortive: proper unequal: petals five, unequal, obtuse, carinated, inflex-emarginate: the stamina consist of five capillary filaments, the length of the corolla, caducous: the anthers roundish and very small: the pistillum is an inferior germ: styles two, very small: the stigma simple: there is no pericarpium: the fruit ovate-oblong, striated, bipartite: seeds two, convex on one side, and ovate-oblong, striated, flat on the other.

The only species is *C. Carui*, Common Caraway.

It is a biennial plant, which has a taper root like a parsnep, but much smaller, running deep into the ground, sending out many small fibres, and having a strong aromatic taste. The whole plant is smooth; the stems are solid, channelled, from eighteen inches to two feet and upwards in height, with spreading branches: the leaves decomposed, long and narrow, on long petioles; leaflets in sixes, in a sort of whorl, two of them longer; segments terminating in a reddish semi-transparent substance. The flowers are in umbels, and of a white colour.

It grows naturally in this country, and flowers in May and June.

The young roots are sometimes eaten as parsneps, and the tender leaves boiled in soup. The seeds are well known to be used in cakes, and incruusted with sugar for comfits.

Culture.—It is increased by sowing the seeds in the autumn, either on the surface or in narrow drills, raking them in. When the plants appear they should be thinned out to six or seven inches, and kept perfectly free from

weeds. It succeeds best on a mellow loamy soil.

CARYOPHYLLUS, a genus containing a plant of the aromatic exotic kind for the stove. The Clove-tree.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a perianth of the fruit superior, quadripartite, acute, small, and permanent: the perianth of the flower superior, tetraphyllous; leaflets roundish, concave, deciduous: the corolla consists of four petals, roundish, crenate, smaller than the calyx of the flower: the stamina have numerous capillary filaments: the anthers are simple: the pistillum is an inferior oblong germ, large, terminating in the calyx of the fruit: the style simple, inserted into the quadrangular receptacle: the stigma simple: the pericarpium is oval, unilocular, terminated by the hardened converging calyx of the fruit, and umbilicate: the seed single, oval, and large.

The only species is *C. aromaticus*, Clove-tree.

It rises, in its native situation, to twenty or twenty-five feet high, dividing, four or five feet from the ground, into branches, which grow erect, covered with a smooth bark, and subdivided into many smaller, garnished with oval-spear-shaped leaves, placed opposite; and small white flowers terminating the branches in loose bunches, succeeded by oval berries, crowned with the permanent calyx. The berries, gathered when half grown and dried, constitute the cloves employed in culinary uses.

Culture.—It is raised by sowing the ripe seeds, procured from abroad, in pots filled with boggy earth, and plunged in a hotbed. When the plants are come up they should be removed to the bark-bed in the stove, where they must be constantly kept.

CASSIA, a genus containing plants of the herbaceous shrubby and tree kinds. Wild Senna.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Leguminosæ*.

The characters are: that the calyx is a pentaphyllous perianthium, lax, concave, coloured, and deciduous: the corolla has five roundish concave petals; the inferior ones more distant, more spreading, larger: the stamina consist of ten declined filaments; the three inferior ones longer; the three superior shorter: the three inferior anthers very large, arcuate, rostrate, gaping at the tip; the four lateral ones without the rostrum gaping; the three superior ones very small and sterile: the pistillum is a subcylindric germ, long, peduncled: the style very

short: the stigma obtuse and ascending: the pericarpium is an oblong legume, partitions transverse: the seeds many, roundish, affixed to the superior suture.

The species mostly cultivated are: 1. *C. Marylandica*, Maryland Herbaceous Cassia; 2. *C. fruticosa*, Shrubby Cassia; 3. *C. villosa*, Villose-leaved Cassia; 4. *C. emarginata*, Emarginate Cassia, or Jamaica Senna Shrub; 5. *C. fistulans*, Cassia Tree, or Pudding-pipe Tree; 6. *C. arborescens*, Tree Cassia; 7. *C. Javanica*, Java Cassia.

The first has a perennial root, composed of a great number of black fibres, sending out in the spring several upright stems, four or five feet high, dividing into many branches pointing obliquely upwards: the leaflets from six to nine pairs, but most commonly eight, and sometimes an odd leaflet: the flowers (two or three together) from the axillas of the upper leaves, and in loose spikes at the end of the stem, which hang down before they open, but are afterwards erect. They are of a pale yellow colour. It is a native of North America.

The second species in its native situation grows upwards of twenty feet high, with several stems covered with brown bark, and dividing into many branches at top: the leaves have two pairs of leaflets, which in the lower ones are oval; but those of the upper five inches long, and two and a half broad in the middle, smooth, and of a light-green: the flowers are produced in loose spikes at the extremity of the branches; are large, of a gold colour, and succeeded by taper brown pods about nine inches long. It is a native of La Vera Cruz.

The third species in its native state rises with a woody stem to the height of fourteen or sixteen feet, sending out many lateral branches: the flowers come out in loose bunches at the ends of the branches, are of a pale straw-colour, and small: the pods are long, narrow, and jointed, each seed being lodged in a sort of isthmus. It is native of Campeachy.

The fourth is a small shrubby tree, with a trunk ten or twelve feet high, and subdivided, round, ash-coloured, pubescent branches: the leaves pinnate, scattered, spreading. The flowers are in racemes, of a yellow colour, irregular, and succeeded by flat pods. It flowers in spring, and is a native of Jamaica.

The fifth species is a tree which rises to the height of forty or fifty feet, with a large trunk, dividing into many branches: the leaflets are equal at the base, having many transverse nerves, and the midrib is very prominent on the under side: the flowers are produced in long spikes at the end of the branches, each standing upon 2

pretty long peduncle; they are of a deep yellow colour, and are succeeded by cylindrical pods, from one to two feet long, having a dark-brown woody shell. It is a native of the East and West Indies.

The sixth in its native state rises with a strong upright trunk to the height of twenty-five or thirty feet, dividing into many branches covered with an ash-coloured bark: the leaves are on long foot-stalks, composed of two pairs of leaflets, four inches long, and near two broad, smooth, of a dark-green on their upper side, but paler underneath. The flowers are produced sometimes from the side of the stalks, where they are few and scattering; but the ends of the branches have large round bunches of flowers, which branch out from one centre; they are of a deep yellow inclining to orange-colour, and are succeeded by compressed pods, near nine inches long, having a border on each side. It is native of La Vera Cruz.

The seventh species rises to a great magnitude, with a large trunk, dividing into many branches: the leaves are very long, composed of twelve or fourteen pairs of smooth leaflets, of a light-green, and placed near together: the flowers come out in loose spikes at the ends of the branches; they are of a pale carnation colour, and succeeded by large cylindrical pods two feet long, and the thickness of a slender arm. It is sometimes called *Horse Cassia*, and is a native of the East Indies.

Culture.—The first sort may be raised by seeds, or by slips made from the roots. In the first mode, the seeds should be sown in the beginning of April, either in pots under the protection of a frame, or on a warm border where the soil is of a dry sandy quality, and covered in lightly. They are usually procured from America. When the plants are sufficiently strong, as in the beginning of the autumn, they should be removed into other pots of larger sizes, or planted out in the borders where they are to remain, as this sort is capable of succeeding in the open air. The slips may be planted out either in the full ground, or in pots, in the early autumn or in the spring, as above; a little water and shade being given till they become perfectly rooted.

The three following shrubby sorts are likewise increased by sowing the seeds procured from their native situations, in the early spring, in pots of light sandy earth, plunging them in a moderate hotbed. When the plants have attained a sufficiently strong growth they should be removed into separate small pots, replunging them into a bark hotbed in the stove, air being rather freely given, and proper shade as well as water occasionally. These should be constantly

kept in the stove, as they are much injured by being placed in the open air, even in the summer season, but some of them will answer well in the greenhouse.

The last three sorts, which are of the tree kind, are increased in the same manner as the above, and require the same sort of management.

When retained in the stove, many of them flower and ripen seeds in the autumn, producing a fine effect; and, from their not losing their leaves, afford variety in the winter. It is observed by Martyn, that all the species contract their leaves in the evening as the sun declines, and open them again as it rises; and that “the under surface of the leaflets is turned outward, the upper surfaces being clapped close together.” But “most plants whose under surface is thus turned outward grow on dry sandy land, where the roots do not find a sufficient supply of moisture; the lower surface of the leaves being generally covered with a short soft down that retains the nightly dews and inhales them.” Those plants which have the upper surface of the leaves turned outwards do not stand in need of this supply; and of course that surface being smooth, the moisture is cast off and not imbibed.

CASSINE, a genus comprehending plants of the evergreen shrubby exotic kind for the greenhouse. Hottentot-Cherry, or Cape Phillyrea.

It belongs to the class and order *Pentandria Trigynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a quinquepartite inferior perianth, very small, obtuse, and permanent: the corolla is quinquepartite, and spreading: divisions subovate, obtuse, larger than the calyx: the stamina consist of five subulate filaments, spreading: the anthers are simple: the pistillum is a superior conic germ: there is no style: the stigmas three, reflex, and obtuse: the pericarpium is a roundish trilocular berry, umbilicated with the stigmas: the seeds are solitary and subovate.

The species cultivated are: 1. *C. Capensis*, Cape Cassine, or Phillyrea. 2. *C. Maurocinia*, Great Hottentot Cherry.

The first has a woody stalk, which in this climate seldom rises more than five or six feet high, sending out many branches, covered with a dark purplish bark; the leaves are stiff, opposite, about an inch and half long, and a little more in breadth, of a light-green, on short foot-stalks: the flowers are produced in roundish bunches from the side, and at the end of the branches; are white, and have five small petals spreading open, being succeeded by red-berried fruit. It is a native of the Cape.

The second species rises to a considerable height.

where it grows naturally, but here it is rarely more than five or six feet high. The stalk is strong, woody, and covered with a purplish bark, sending out many stiff branches. The leaves are very thick, for the most part opposite, about two inches long and almost as broad, of a dark green colour. The flowers come out from the side of the old branches in clusters, three, four, or five together, on one common slender peduncle; are first greenish yellow, but changing to white. They are succeeded by large red cherry-like fruit. It is a native of the Cape.

Culture.—These plants, as they do not produce ripe seed in this climate, must be increased either by layers or cuttings, but the first is the best method.

The layers should be made from the young shoots near the root, which, as they take root with difficulty, should be twisted in the part laid down, and the business performed in the autumn.

With cuttings, the best practice is to take the shoots of the preceding year, which should be cut with a little of the old wood to them, and planted in the early spring, in pots filled with a rather mellow, loamy earth, plunging them in a hot-bed, kept close and shaded, taking care that very little water be given at the time.

They take root much more readily in the former than the latter method; requiring one year in the first, and generally two in the second before they are well rooted.

When they have become well rooted they should be taken off, and removed into separate small pots, being shaded till well re-established, and then placed in a warm sheltered situation during summer, but taken under the protection of the greenhouse before the approach of frosts in the autumn. They require water rather freely in the hot season, but very sparingly in winter: and air should be admitted freely when the weather is suitable.

They are very ornamental in the greenhouse, from their stiff evergreen leaves, and the fine appearance of the fruit.

CASSIOBERRY-BUSH. See VIBURNUM.

CATALPA. See BIGNONIA.

CATANANCHE, a genus containing a plant of the herbaceous perennial flowery kind. Candia Lion's-foot.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Compositae*.

The characters are: that the calyx is common imbricate, turbinate; leaflets very many, loosely incumbent, acute, scarious; the squamule ovate-acuminate, concave, lax, glossy and permanent: the corolla is compound, generally

imbricate, uniform; corollets hermaphrodite, very many; the exterior ones longer.

Proper monopetalous, ligulate, linear, truncate, five-toothed: the stamina consist of five capillary filaments, very short: the anthers are cylindric, and tubular: the pistillum is an oblong germ: the style filiform, length of the stamens: the stigma bifid and reflex: there is no pericarpium: the calyx unchanged: the seeds solitary, turbinate-ovate: down from a five-awned calycle: the receptacle is chaffy.

The species chiefly cultivated is *C. cærulea*.

It is perennial, sending out many long, narrow, hairy leaves, which are jagged on their edges. Between the leaves the flower-stalks come out, which are in number proportioned to the size of the plant; as from an old thriving root there are frequently eight or ten, and young plants seldom send out more than two or three. These stalks rise near two feet high, dividing into many small branches upward, with leaves like those below, but smaller, and have few or no jags on their edges; each of the peduncles is terminated with single heads of flowers, of a blue colour, having a dry, silvery, scaly calyx.

It is a native of the south of Europe, flowering from July to October.

There is a variety with double flowers.

Culture.—It is increased by sowing the seeds in the early spring, on the borders where the earth is light: the plants when sufficiently strong may, some of them, be removed into pots; but they flower best when left where sown. The double sort is best increased by slipping the roots and planting them out either in the early autumn or spring seasons; but in this way the roots should not be divided into too small parts, as that prevents their sending up a sufficient number of stalks for flowering.

These are very ornamental plants for the borders or clumps, where sufficiently dry, warm, and protected, as they continue several years.

Some plants may likewise be preserved in pots, to set out in assemblage with other potted plants.

CATECU. See ARECA.

CATERPILLAR, a well known highly destructive insect to various sorts of trees and plants.

There are several different kinds; but those that are the most destructive to vegetables and fruits in the garden are the yellowish green, the black, and the dark rough-skinned leathery kinds. The first is generated from the ova of the white butterfly deposited upon the leaves and other parts of the plants. The second sort mostly show themselves in March, when the weather is dry, upon trees of the pear, apple, and other kinds, sometimes contained in large webs.

They deposit their ova on the leaves, and in the crevices of the bark of the trees, from which new insects are generated during the summer months. Mr. Hit supposes some of them to remain in these situations during the winter; having found them in nail-holes and under pieces of old bark in February. The last sort is generated in the middle of the inclosed leaves of different sorts of plants, such as those of the Cabbage, Brocoli, and other similar kinds. These produce much mischief by eating through the stems and other parts of the plants.

Doctor Darwin observes that there are two breeds of these insects in the year, the *larvæ* of the first devouring the spring leaves, and those of the second the summer shoots.

Various methods have been attempted for destroying the different sorts of caterpillars, both such as are destructive to esculent plants and to trees of the fruit kinds. With the first, much advantage may be gained by careful attention in picking them off from the leaves or other parts of the plants on their first appearance. The beds or other places where the vegetables grow should also be carefully examined early in the mornings, in order to destroy them before they retire into the holes and crevices that conceal them during the day-time. And as they are in general the most prevalent when the weather is dry, it seems not improbable but that considerable benefit may be obtained by watering the plants frequently, both with common water, and such liquids as contain ammonia or volatile alkali, either from the effects of such waterings on the caterpillars themselves, or from their promoting the growth of the plants in so vigorous and rapid a manner as to render them incapable of being devoured by them.

Mr. Forsyth advises, that during the winter and spring months, every *chrysalis* that can be discovered, either under the copings of walls, on gates, or palings, and about the eaves, doors and windows of houses, should be completely removed and destroyed.

Where caterpillars abound, all the leaves that are affected should be removed with care, and swept up in order to be destroyed by fire, or formed into a compost with other substances.

The ten-threaded caterpillar is eagerly sought after by birds, and is capable of being easily destroyed; but, when neglected, the ova are deposited in great abundance in the latter part of summer, as about July, on the undersides of the leaves, in rows, with little white specks, and quickly hatched on account of the heat of the season, the young caterpillars coming forth in swarms to destroy the autumnal leaves. At

this season they may be picked off the infected leaves, and their generation be by that means prevented.

Bushes or plants that are much affected with caterpillars one year, are extremely liable to be attacked with them afterwards.

In the second case, or with fruit-trees, "the best method of preventing them from being infested is, according to Mr. Forsyth, to scrape the stems with a piece of bone or wood made in the form of a knife, taking care not to bruise the bark; and afterwards to wash the tree and wall with an equal quantity of soap-suds and urine mixed;" and "as soon as the leaves are off the trees in autumn, they should be raked and swept up; then carried to the melon-ground, and mixed up with other leaves and dung for hot-beds:" by this means a great number of eggs of insects that are deposited on the under-sides of the leaves may be got rid of. Afterwards all the stems of the trees, and all the ends of the buds, should be washed, taking care not to hurt the buds: "in doing this, it is observed, that what falls will destroy the slugs that take shelter on the offset of the wall and in the borders, before they are dug for planting lettuce, endive, &c. This washing should be repeated about the beginning of February, which will destroy any eggs of different insects that may still remain about the trees. A painter's brush may be used for laying the mixture on the trees, and a soft broom, or a brush made of the ends of garden matting, for washing the wall. The matting seems preferable, as, being soft and flexible, it will enter the holes and crevices." And "the mixture that falls on the border and offset of the wall, in this second washing, will destroy those slugs and insects that made their appearance early. The stems and branches of the trees may be washed two or three times, or oftener, in the spring, before the buds begin to swell; but the branches must not be rubbed after the trees come into flower; they may, however, be sprinkled over with the mixture from a watering-pot with a rose just before the buds begin to open, but by no means after they are open; as it will, by its glutinous nature, render the bloom liable to be scorched by the sun." These washings, &c. are recommended "for all trees, standards as well as those on walls; particularly apple, cherry, and plum-trees." Where any caterpillars remain, they may "be discovered by the curling of the leaves; for every curled leaf has one or more caterpillar, or other insect, in it: such leaves should therefore be carefully pulled off, and the insects crushed; as, when

neglected, they frequently devour every leaf, leaving the tree quite naked, and of course destroy the fruit for that season at least.

In order to remove the gregarious sorts of caterpillars, which are enclosed in great numbers in nets or bags resembling strong cobwebs, and fixed to the branches of trees or shrubs, the nests should be carefully picked off, and the insects crushed, by which vast numbers of them may be destroyed. After the trees have been thus cleared, they should be washed as above to destroy those stragglers that may still remain on them. But "after the trees come into flower, instead of washing them with urine and soap-suds, they should be well watered with clear lime-water mixed with tobacco-water."

It is remarked by Mr. Forsyth, that as "there are several species of moths, that in the caterpillar state are very hurtful to plums and other fruit-trees," it would "be a great advantage to destroy them on their first appearance. In clearing trees from insects of other kinds, caterpillars should also be carefully looked for and picked off. They will be found to "shelter themselves at the ends of the shoots, in the flowers, and at the bottom of the footstalks of the flowers." It is added that "there are two or three sorts that infest fruit-trees, two of a brown and one of a green colour."

The success of this method of clearing and washing has been very evident in the practice of Mr. Forsyth in different sorts of apple-trees, they recovering themselves afterwards in a rapid manner.

It has long been a common opinion that cold and severe frost have considerable effects in destroying caterpillars, as well as the larvæ and ova of different insects: but the experiments of Reaumur and Bonnet seem to show that this is not the case; as, on the former subjecting "a parcel of young caterpillars to a degree of cold lowered to fifteen degrees below zero on his thermometer, Dr. Anderson observes, they suffered no injury; and the latter found the same to be the case with the common cabbage caterpillar, and also the *chrysalis* of the common butterfly.

It is ingeniously suggested, by Mr. Forsyth, that by a better and more intimate acquaintance with the habits and economy of these animals, we might, probably, be enabled to discover more certain methods of destroying them.

CATESBÆA, a genus containing a plant of the exotic shrubby kind. The Lily-Thorn.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Lauridæ*.

The characters are: that the calyx is a four-toothed, superior perianthium, very small, acute, and permanent: the corolla is monopetalous, funnel-form: tube extremely long, straight, gradually widening upwards: border semi-quadrifid, broad, erect-flat: the stamina consist of four filaments, growing within the neck of the tube: the anthers oblong, erect, almost longer than the corolla: the pistillum is a roundish, inferior germ: the style filiform, length of the corolla: the stigma simple: the pericarpium an oval berry, crowned, unilocular: the seeds many, angulate.

The species cultivated is *C. spinosa*, Lily-Thorn.

It rises with a branching stem to the height of ten or twelve feet, covered with a pale russet bark: the branches come out alternately from the bottom to the top, with small leaves resembling those of the box-tree, in clusters all round the branches, at certain distances: the flowers come out single from the sides of the branches, hanging downward; and are of a dull yellow colour. The berry is the size of a middling plum, hollow within, with small angular seeds. It is a native of the Bahama islands, flowering here in the summer.

Culture.—It is capable of being propagated either by seeds, or cuttings of the young shoots. The seeds, procured from abroad, should be sown in pots of light earth, in the early spring months, and plunged in the bark-bed. The cuttings may be planted at any time during the summer months, in pots, plunging them in the tan-bed; and when closely covered with hand-glasses, their rooting is facilitated. It is a very ornamental shrub; but must be always kept in pots of light sandy earth, in the stove.

CAULIFLOWER. See **BRASSICA**.

CEANOTHUS, a genus comprising plants of the tree and shrubby exotic kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a one-leaved, turbinate perianthium; border five-parted, acute, close-converging, and permanent: the corolla has five equal petals, roundish, of an arched saccular shape, compressed, very obtuse, spreading, smaller than the calyx, seated on claws the length of the petal, growing from the interstices of the calyx: the stamina consist of five subulate, erect filaments, opposite to the petals, the length of the corolla: the anthers are roundish: the pistillum is a superior, triangular germ: the style cylindric, semitrid, the length

of the stamens: the stigma obtuse: the pericarpium is a berry (capsule), dry, three-grained, three-celled, obtuse, retuse, and set with tubercles: the seeds solitary and ovate.

The species commonly cultivated are: 1. *C. Americanus*, American Ceanothus, or New Jersey Tea; 2. *C. Asiaticus*, Asiatic Ceanothus; 3. *C. Africanus*, African Evergreen Ceanothus.

The first in this climate is a shrub, which seldom rises more than three or four feet high, sending out branches on every side from the ground upwards: the branches are very slender, and, as it is pretty late in the spring before they begin to shoot, keep growing very late; consequently, unless the autumn proves dry and mild, the tender shoots are often killed down very low by the early frosts; but in favourable seasons, the extreme parts of the shoots only are injured by the cold: these branches are garnished with oval-pointed leaves, placed opposite, deciduous, and of a light green colour: the flowers are produced at the extremity of each shoot in close thick spikes, and composed of five small petals, of a clear white colour, making a fine appearance, as the whole shrub is covered over with flowers.

These appear in July, and in mild seasons again in October. It is a native of North America, where the leaves are sometimes used as tea.

The second species rises with a shrubby branching stem, four feet high. The branches are alternate, flexuose, striated and smooth: the leaves are alternate, resembling those of the pear, acuminate, smooth, at the ends of the small branches, scarcely an inch in length, on petioles half the length of the leaves: the racemes from each axilla usually two, small, the length of the petioles, consisting of many florets, on very short pedicels, caducous, one often remaining which bears fruit: hence the raceme is toothletted from the falling of the flowers, which are of a greenish colour: the berries are large. It is a native of Ceylon, &c.

The third species rises to the height of ten or twelve feet, with a woody stem, covered with a rough dark-coloured bark, and sends out many weak branches, which hang downwards: these while young are green, but afterward change to a purplish colour: they are garnished with oblong pointed leaves, of a lucid green, smooth, and slightly serrate on their edges: the flowers are small, of an herbaceous colour, coming out from the side of the branches; sometimes appearing in July, but not succeeded by seeds in this climate, nor do the plants often produce flowers; being chiefly preserved for the beauty of their shining evergreen leaves. It is a native

of the Cape, and sometimes known by the title of *Alaternoides*.

Culture.—This, in the first sort, may be effected either by seeds or layers. In the first mode the seeds should be sown, as soon as procured, in pots of light earth, lightly covered in, placing them in a frame, to have occasional shelter in bad weather; and in spring plunge them in a hot-bed to bring up the plants, hardening them gradually to the full air in summer, but in autumn removing them to have shelter until the following spring, when they should be planted out in separate small pots, or in a nursery-bed in the full ground, being covered occasionally again in the following winter, as they require protection from severe frost the two or three first years of their growth.

In the latter method, some of the youngest branches should be laid down in autumn, in the usual way, which become rooted in twelve months, and in the spring after should be planted out. Some of the first young shoots may also be laid down during the summer, in order to have the greater chance of success.

In the second species the propagation may be effected by seeds, which should be sown in pots of light earth, plunging them in the bark-bed, and likewise by laying the young shoots down in the autumn, plunging the pots as above: the plants afterwards should be managed as other woody exotics of the stove.

The third sort is raised expeditiously by laying down the young shoots, either in their own pots, or others placed for the purpose, in the autumn. They are also capable of being increased by young cuttings, planted in the spring in pots, plunging them in the bark- or other hot-bed about two months. They afterwards require only the ordinary culture of greenhouse plants.

The first is an elegant little flowering shrub, for the more conspicuous compartments of the shrubbery, being planted in a moderately dry soil and sheltered situation, in the fronts of the clumps or borders.

The second affords variety in the stove; and the third is worthy of a place in the greenhouse collection, for the beauty of its shining green leaves.

CEDAR, *Barbadoes*. See CEDRELA.

CEDAR, *Bermudas*. See JUNIPERUS.

CEDAR, *Carolina*. See JUNIPERUS.

CEDAR, *Lebanon*. See PINUS CEDRUS.

CEDAR, *Lycian*. See JUNIPERUS.

CEDAR, *Phœnician*. See JUNIPERUS.

CEDAR, *Virginian*. See JUNIPERUS.

CEDAR, *White*. See CUPRESSUS.

CEDRELA, a genus containing a plant of the exotic tree kind for the stove. Bastard Cedar.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that the calyx is a monophyllous campanulate perianthium, very small, five-toothed, and withering: the corolla is funnel-form, pentapetalous; the tube bellied below: the petals linear-oblong, obtuse, erect, adjoined to the receptacle at one-third beneath: the stamina consist of five subulate filaments seated on the receptacle, shorter than the corolla: the anthers are oblong, bent outwards at the tip: the pistillum is a receptacle proper five-cornered: germ globular: style cylindric, length of the corolla: stigma headed, depressed: the pericarpium is a superior woody capsule, roundish, five-celled, five-valved; valves deciduous.

The species cultivated is *C. odorata*, Barba-does Bastard Cedar.

In its native situation it rises with a straight stem to the height of seventy feet or more, but is small in this climate. While young the bark is smooth, and of an ash-colour; but, as it advances, becomes rough and of a darker colour: toward the top it shoots out many side branches, garnished with winged leaves, composed of sixteen or eighteen pair of leaflets, sometimes near three feet long, and of a pale colour, emitting a rank odour in the summer season: the fruit is oval, about the size of a partridge's egg, smooth, and of a very dark colour. It is a native of the West Indies.

Culture.—In this plant it is effected by sowing the seeds, obtained from abroad, in the autumn or spring months, in small pots filled with a light earth, plunging them in a hotbed. When the plants are of sufficient growth they should be removed with care into other small pots separately, and placed in the bark-bed, being afterwards managed as others of the woody stove kind.

CELASTRUS, a genus comprehending plants of the evergreen and deciduous shrubby kinds, for the greenhouse.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumosæ*.

The characters are: that the calyx is a one-leaved perianthium, half-five-cleft, flat, small; divisions obtuse, unequal: the corolla consists of five ovate petals, spreading, sessile, equal, reflected at the borders: the stamina consist of five subulate filaments, the length of the corolla: the anthers are very small: the pistillum is a very small germ, immersed in a large flat receptacle, which is marked with ten streaks: style subulate, shorter than the stamens: stigma obtuse, trifid: the pericarpium is a coloured cap-

sule, ovate, obtusely triangular, gibbous, trilobular, trivalvular: the seeds are few, ovate, coloured, smooth, half involved in an unequal coloured arillus with a four-cleft mouth.

The species most generally cultivated are: 1. *C. bullatus*, Studded or Evergreen Virginia Staff-Tree; 2. *C. scandens*, Climbing Staff-Tree, or Bastard Euonymus; 3. *C. pyracanthus*, Pyracantha-leaved Staff-Tree, or Ethiopian Box-Thorn; 4. *C. buxifolius*, Box-leaved Staff-Tree.

There are other species that deserve cultivation.

The first in its native situation rises to the height of eight or ten feet, but in this climate few of these shrubs are much more than half that height. It generally puts out two or three stems from the root, which divide upward into several branches covered with a brown bark: the leaves are near three inches long and two broad, placed alternately on the branches: the flowers come out in loose spikes at the end of the branches, and are white: the capsule is of a scarlet colour, set full of small protuberances. It flowers in July, but seldom produces good seeds here. It is a native of Virginia.

The second species sends out several woody stalks, which are flexible, and twist themselves round trees and shrubs, or round each other, to the height of twelve and fourteen feet or more, girdling trees so closely as in a few years to destroy them. The leaves are about three inches long, and near two broad, serrate, alternate, of a lively green above, but paler on their under side, having several transverse nerves: the flowers are produced in small bunches towards the ends of the branches; are of an herbaceous colour, and succeeded by roundish three-cornered capsules, which are red when ripe, spreading open, and disclosing their seeds in the same manner as the spindle-tree. It flowers in the beginning of June, and ripens seeds in autumn. It is a native of North America.

The third rises with an irregular stalk three or four feet high, sending out several side branches covered with brown bark: the leaves are about two inches long, and more than half an inch broad, some pointed and others obtuse; they are stiff, of a lucid green, coming out irregularly from the branches, and continuing green through the year: the flowers are produced from the sides of the branches in loose tufts, many from one point, on long peduncles, and of an herbaceous white colour: the fruit is of a fine red colour, opening into three cells, containing an oblong hard seed. It is a native of the Cape, flowering the greatest part of the summer.

The fourth rises with a slender woody stalk to the height of ten or twelve feet, covered with

a light ash-coloured bark, and full of joints, armed with long spines, upon which grow many small leaves: the branches are slender, armed also with spines at every joint; but the whole plant is so weak as to require support: the leaves come out in clusters without order, are shaped somewhat like those of the narrow-leaved box-tree, but longer and of a loose texture; are obovate and acutely serrate: both the branches and branchlets are angular: the flowers are on peduncled cymes from the axils, and the fruit globular. It is a native of the Cape, flowering in May and June.

Culture.—The two first species are capable of being raised either by seeds or layers, but the latter is the more ready method.

In the first mode, the seeds should be sown upon light fresh earth, either in beds or pots, as soon as they are procured from abroad, keeping them perfectly free from weeds till the plants are of sufficient growth to be planted out in nursery-beds, watering them occasionally when the weather is dry. They are mostly fit for this in the course of about two years.

In the latter method, layers from the young shoots should be laid down in the autumn, slitting them at a joint on the under sides. They are mostly sufficiently rooted to be taken off and planted out in the nursery in rows by the succeeding autumn.

The latter species should have a rather moist loamy soil.

The two last sorts are likewise capable of being increased in the same methods; but they should be in pots, in order to their being placed under the protection of frames or other contrivances when the weather is severe. After they have had a twelvemonth's growth they may be removed into other pots separately.

Cuttings made from the young shoots in all the sorts may likewise be stricken in the early spring months in pots exposed to a hotbed heat. These may be planted out in the following autumn, either in pots separately, or where they are to remain, according to their kinds.

These sorts should not be treated too tenderly, as they are apt to be rendered weak in their branches and less verdant.

The two first species are of a hardy nature, being well adapted to the borders and clumps of pleasure-grounds in mixture with other shrubs of the more tall growths. The first should, however, have a warm aspect and rather dry soil. The latter also succeeds in wilderness quarters under the shade of tall trees, where it winds itself about them to a great height, producing a fine effect in the autumn by its fruit.

The last two sorts are more tender, requiring,

as just observed, to be kept in pots to have the protection of the greenhouse in winter, where they afford variety in assemblage with others of the more hardy kinds.

CELERY. See *APIUM*.

CELOSIA, a genus containing plants of the flowery ornamental annual kind. The *Amaranth*, or *Cock's Comb*.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Miscellaneæ*.

The characters are: that the calyx is a three-leaved perianthium: leaflets lanceolate, dry, acute, and permanent, similar to the corolla: the corolla has five petals, lanceolate, acuminate, erect, permanent, stiffish, calyciform: the nectary a margin surrounding the germ, very small, five-cleft: the stamina consist of five subulate filaments, conjoined at the base to the plaited nectary, the length of the corolla: the anthers versatile: the pistillum is a globular germ: the style subulate, straight, the length of the stamens: the stigma simple: the pericarpium is a globular capsule, surrounded by the corolla, one-celled, circumcised: the seeds few, roundish, and emarginate.

The species commonly cultivated are: 1. *C. cristata*, Crested *Amaranth*, or *Cock's Comb*; 2. *C. margaritacea*, Pearly Spiked *Celosia*, or *Cock's Comb*; 3. *C. coccinea*, Scarlet *Celosia*, or Chinese *Cock's Comb*; 4. *C. lanata*, Woolly *Celosia*.

The first has an upright, stiff, single stem, from one to five feet in height: the leaves are large, oval, spear-shaped, on angular foot-stalks: the principal stem is crowned with a large crested head composed of numerous small florets placed closely together, resembling the comb of a cock. It is a native of Asia.

There are many varieties, differing in form, magnitude, and colour, from the same seed. In the Dwarf kinds, with large purple heads of flowers, with red heads, with scarlet heads, and with yellowish heads: in the Giant kinds, with very large purple heads, with red heads, with scarlet heads, with yellowish heads, with white heads, and with variegated heads: in the Branching kinds, with purple, with red, and with buff-coloured flowers.

The editor of *Miller's Dictionary* has raised great varieties from seeds from China and other countries, but generally found them alter in a few years, notwithstanding great care was taken in saving the seeds. The principal colours of their heads were red, purple, yellow, and white; but he has had some whose heads have been variegated with two or three colours. He also raised some from seeds from Persia, whose heads were divided like a plume of feathers, and were

which spread horizontally on every side, and have a smooth greenish bark: the leaves are about an inch and half long, and near an inch broad, inclining to a heart shape, but oblique, one side of the base being smaller and lower than the other; they are of a thicker texture than those of the common sort, and of a paler green, alternate as they are, and on short foot-stalks: the fruit is oval and yellow, but when fully ripe turns to a darker colour. The wood is very white.

The fourth is a shrubby tree, which seldom rises above ten or twelve feet, and throws out a great number of loose branches. It is a native of Jamaica, flowering in August and September.

Culture.—All the sorts are capable of being increased by seeds.

These should be sown as soon as they can be procured (if in the autumn the better) either in pots, boxes, or in a warm rich border, covering them lightly in. When the plants appear they should be occasionally sheltered by mats in cold nights, and in dry hot weather, while very small, have shade in the middle of hot sunny days during summer, and frequent waterings should likewise be given; and in autumn and winter be protected from frost by occasional coverings. In the early spring months, when of one or two years' growth, they should be pricked out in rows in a sheltered situation, a foot asunder: they require no further trouble but occasional weeding. In two, three, or more years they are ready for planting out in the shrubbery or other plantations.

Their early growth may be greatly promoted by the aid of a hotbed.

The variegated varieties should be continued by laying down the young shoots in the autumn, being taken off and planted out when well rooted.

These trees are sufficiently hardy to prosper here in the open ground, in any exposure or soil.

They are well adapted for plantations, on the boundaries of extensive lawns, wilderness-walks, and the most conspicuous parts of parks, either placed in clumps or singly.

The two first sorts may also be employed as forest-trees, as they are of free growth, and their wood tough and pliable.

CENTAUREA, a genus containing plants of the herbaceous annual and perennial kinds.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositae*.

The characters are: that the calyx is common imbricate, roundish; scales often variously termi-

nated: the corolla is compound, flosculous, difform: corollules hermaphrodite, very many in the disk. Females fewer, larger, lax, in the ray: proper of the hermaphrodite monopetalous; tube filiform; border ventricose, oblong, erect, terminated by five divisions, which are linear erect: of the females monopetalous, funnel-form; tube slender, gradually enlarged, recurved; border oblong, oblique, unequally divided: the stamina in the hermaphrodites have five capillary filaments, very short: anthers cylindric, tubular, length of the corollule: the pistillum in the hermaphrodites is a small germ: style filiform, length of the stamens: stigma very obtuse, projecting in a point, which in many is bifid: in the females, a very small germ: style scarce any: there is no stigma or pericarpium: calyx unchanged, converging: the seeds in the hermaphrodites solitary: down or egret in most plumose or pilose: in the females none: the receptacle is bristly.

The species are very numerous, but those most commonly cultivated are: 1. *C. Centaureum*, Great Purple Centaury; 2. *C. montana*, Perennial Blue-Bottle, or Blue Bachelor's Button; 3. *C. Cyanus*, Annual Blue-Bottle, or Bottles of all Sorts; 4. *C. moschata*, Purple Sweet Centaury, or Sweet Sultan.

The first has a strong perennial root, and a great number of long pinnate leaves, of a lucid green, spreading wide on every side, proceeding from it: the peduncles are slender, but very stiff, and divide at top into many smaller peduncles. These, together with the stalks, rise five or six feet high, having at each joint one small pinnate leaf of the same form with the others: each of the peduncles is terminated by a single head of purple flowers, considerably longer than the calyx. They come out in July, and in very warm seasons produce ripe seeds in this climate. It is a native of the mountains of Italy, &c.

The second species has a perennial root, running deep into the ground: the stem is commonly single, upright, one-flowered; sometimes, especially in a cultivated state, it puts forth a branch or two: the leaves are quite entire, tomentose: the flower large and specious. It is a native of the South of Europe.

There are varieties, with broad leaves, with narrow leaves, and Dwarf Perennial Blue-Bottle.

In the third species the stem is from one to two feet high, angular, slightly tomentose, branched at top: the leaves are numerous, white underneath, with three parallel ribs: the branches are one-flowered. It flowers from June to August. The wild flower is usually blue, but sometimes white or purple.

It varies with blue flowers, with blue and

white flowers, with purple flowers, with purple and white flowers, with flesh-coloured flowers, with flesh-coloured and white flowers, with violet-coloured flowers, with violet and white flowers, with red flowers, with double blue flowers, with double purple flowers, and with double purple and white flowers.

The fourth species is annual, and sends up a round channelled stalk near three feet high, which divides into many branches, with jagged leaves, of a pale green, smooth, and close to the branches; from the side of the branches come out long naked peduncles, each sustaining a single head of flowers, which have a very strong odour, so as to be offensive to many people, but to others very grateful: they are purple, white, or flesh-coloured. It is a native of Persia.

It varies with purple flowers, with white flowers, with flesh-coloured flowers, with purple fistulous flowers, with white fistulous flowers, with fringed flowers with sawed leaves, and with bright yellow fistular flowers.

Culture.—These plants are raised with little trouble or difficulty. The first sort is capable of being increased by parting the roots, and planting them out in the early spring months or in the autumn, in beds or borders where they are to remain.

And this, as well as the annual sorts, may likewise be raised from seed, which in it and the second species should be sown in the borders or clumps in March or the following month, the young plants being kept clean from weeds, and removed into other situations, when necessary, in the following autumn.

The third and fourth species and varieties are also propagated by sowing the seeds in the open ground where the plants are to flower, in the above season. They should be put in, in patches of six or seven seeds in a place, covering them lightly in, to the depth of about half an inch. The latter sort may also be sown in the autumn as soon as the seeds are fully ripened, by which means they will flower at a much more early period in the following year.

The Sweet Sultan kinds, and especially the Yellow, which is rather tender, may also be rendered more forward by sowing the seeds under frames or glasses on gentle hotbeds in the early spring, removing the plants to the open ground when of sufficient growth, with balls of earth about their roots, or into pots.

All the sorts are proper for ornamenting the clumps and borders of pleasure-grounds; the two first being placed more backward in them, as growing large.

CEPA. See ALLIUM.

CEPHALANTHUS, a genus comprehend-

ing a plant of the hardy exotic deciduous flowering shrubby kind. The Button-Tree.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx has no common perianthium, but the receptacle collecting many floscules into a globose head: perianthium proper one-leaved, funnel-form; angular; border quadrifid: the corolla is universal equal: proper monopetalous, funnel-form, acute, quadrifid: the stamina consist of four filaments, inserted into the corolla, shorter than the border: anthers globose: the pistillum is an inferior germ: style longer than the corolla: stigma globose: there is no pericarpium: the seeds solitary, long, attenuated at the base, pyramidal and lanuginous: the receptacle common globular and villous.

The species commonly cultivated is *C. Occidentalis*, American Button-wood.

It is a shrub that seldom rises higher than six or seven feet in this climate. The branches come out by pairs, opposite at each joint: the leaves are either in pairs opposite, or there are three at the same joint, standing round the branch; these are near three inches long, and one and a quarter broad, having a strong vein running longitudinally through the middle, and some small transverse veins from that to the borders; they are of a light-green, and their foot-stalks change to a reddish colour next the branches; the ends of the branches are terminated by loose spikes of spherical heads, about the size of a marble, each of which is composed of many small flowers, of a whitish yellow colour, fastened to an axis in the middle; appearing in July, and, in warm seasons, succeeded by seeds, which have sometimes ripened here.

Culture.—This shrub is capable of being raised either by seeds procured from its native situation, or by layers and cuttings. In the first mode the seeds should be sown in beds in the open ground as soon as they are procured, which if in the autumn, the plants mostly appear in the spring; but when it is done late in the spring they will sometimes not rise till the spring following. The earth should be kept free from weeds, giving shade to the plants in very hot weather, and a little protection from severe frost. The first summer the plants should be frequently watered in dry weather; and when they are of one or two years' growth, according to their strength, transplanted in the autumn or spring months in the nursery lines, where they should remain till fit for the shrubbery.

The layers of the young shoots should be put down in the autumn, and in the following autumn be taken off and planted where they are to stand.

Cuttings may likewise be made in the autumn or spring, and planted out in a rather moist shady situation, care being taken to keep them free from weeds. When they have become well rooted, they may be removed into the places where they are to remain.

This shrub affords an agreeable variety when in assemblage with others, either in the open ground or other collections.

CERASTIUM, a genus containing plants of the low herbaceous kind. Mouse-ear Chickweed.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a five-leaved perianthium; leaflets ovate-lanceolate, acute, spreading and permanent: the corolla has five petals, bifid, obtuse, erect-expanding, length of the calyx: the stamina consist of ten filaments, filiform, shorter than the corolla; the alternate ones shorter: anthers roundish: the pistillum is an ovate germ: styles five, capillary, erect, length of the stamens: stigmas obtuse: the pericarpium is an ovate-cylindric or globular capsule, obtuse, unilocular, gaping with a five-toothed tip: the seeds are very many and roundish.

The species cultivated are; 1. *C. perfoliatum*, Perfoliate Mouse-ear; 2. *C. repens*, Creeping Mouse-ear or Sea Pink.

There are other species that may be cultivated.

The first is an annual plant, which rises with an upright stalk a foot high; the lower leaves have much resemblance to those of Lobel's Catchfly: the stem-leaves are of the same shape, but smaller, placed by pairs, and embracing the stalks: the flowers come out at the top of the stalks, and also from the wings of the leaves on the upper part of the stalks; they are white, and shaped like those of chickweed; appearing in May and June, and succeeded by beaked capsules, containing many seeds of a roundish form. It is a native of Greece.

The second species sends out many weak stalks which trail upon the ground, and put out roots at their joints: the leaves are about two inches long, and little more than half an inch broad, very hoary; those next the root are much smaller than the upper ones: the flowers come out from the side of the stalks upon slender peduncles, which branch out into several smaller, each supporting a white flower. It was formerly cultivated in gardens, under the title of Sea Pink, as an edging. It is a native of France, &c.

Culture.—The propagation in these plants is

readily effected either by seeds, slips from the rooting branches, or parting the roots, each of which may be performed either in the autumn or spring season, placing them in proper situations in the open ground. The trailing branches root as they extend themselves, at each joint, by which they easily multiply.

Being of spreading growth, they are highly useful for covering naked banks, and running over artificial rock-works, ruins, grottos, and other similar parts of pleasure-grounds.

CERASUS, the Cherry-tree. See PRUNUS.

CERATONIA, a genus containing a plant of the evergreen exotic shrubby kind. The Carob-tree, or St. John's Bread.

It belongs to the class and order *Polygamia Trioecia* and ranks in the natural order of *Lo-mentaceae*.

The characters are: that in the male the calyx is a five-parted perianthium, very large: there is no corolla: the stamina consist of five subulate filaments, very long, spreading: the anthers large, twin: in the female the calyx is a one-leaved perianthium, divided by five tubercles: there is no corolla: the pistillum is a germ lying concealed within a fleshy receptacle: style long, filiform: stigma headed: the pericarpium is a legume, very large, obtuse, compressed, coriaceous, with a great many transverse partitions, the interstices filled with pulp: the seed solitary, roundish, compressed, hard, glossy: hermaphrodite flowers on a distinct tree.

The species cultivated is *C. siliqua*, the Carob-tree.

It rises with an upright thick woody stem to the height of fifteen or twenty feet in its native situation: the head divided into many branches: the leaves are pinnate, leaflets roundish entire, thick, rigid, of a darkish green colour, three inches in breadth, and rather more in length: the flowers are small, of a dark purple: these are succeeded by large fleshy compressed seed-pods, containing many seeds in a soft pulp. It is a native of Syria, &c.

Culture.—It is propagated by sowing the seeds procured from its native situation, in pots of light earth in the spring, plunging them in a moderate hot-bed, and, after the plants have attained sufficient growth, removing them into separate pots, shade, water, and fresh air being occasionally given, and the pots continued in the hot-bed. When the weather becomes fine in the summer, they should be gradually hardened by exposure to the free air, and placed out till the approach of autumn, when the protection of the greenhouse will be necessary.

They are afterwards to be managed as other greenhouse plants.

CERCIS, a genus containing hardy deciduous trees of the flowering kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium, very short, bell-shaped, gibbous below, melliferous; mouth five-toothed, erect and obtuse: the corolla is pentapetalous, inserted into the calyx, resembling a papilionaceous corolla: wings: petals two, bent upwards, affixed by long claws: standard: petal one, roundish, clawed beneath the wings, and shorter than the wings: keel: petals two, converging into a cordate figure, including the organs of generation, affixed by claws: the nectary is a style-shaped gland, below the germ: the stamina consist of ten, distinct, subulate filaments, bent downwards, of which four are longer than the rest, and covered: the anthers oblong, incumbent, rising upwards: the pistillum is a linear-lanceolate, pedicelled germ: style of the length and situation of the stamens: stigma obtuse, ascending: the pericarpium is an oblong legume, obliquely acuminate, unilocular: the seeds some, roundish, connected to the superior suture.

The species are: 1. *C. siliquastrum*, Common Judas-tree; 2. *C. Canadensis*, Canada Judas-tree, or Red Bud-tree.

The first rises with an upright trunk to the height of twenty feet, covered with a dark brown bark, dividing upwards into many irregular branches, with leaves placed irregularly on the branches, on long foot-stalks; they are of a pale green on their upper, and of a grayish colour on their under side, and fall off in autumn. The flowers come out in the spring with the leaves on every side the branches, and many times from the stem of the tree in large clusters, arising from the same point, on short peduncles, and are of a very bright purple colour, being in full beauty before the leaves have attained half their size. When the flowers fall off, the germ becomes a long flat pod, containing a row of roundish seeds, a little compressed.

The wood is very beautifully veined with black and green, taking a fine polish. It is a native of the Levant, &c.

There are varieties with white flowers; with flesh-coloured flowers, but without the beauty of the first; also with broader pods.

The second sort grows to a middling stature in the places where it is a native, but in this climate rarely rises with a stem more than

twelve feet high, but branches out near the root. The branches of this are weaker than those of the first sort; the leaves are downy, and terminate in points; whereas those of the first are smooth, and round at the end, where they are indented. The flowers are also smaller; but the trees are equally hardy, thriving in the open air. It is a native of North America, where it is known by the title of Red Bud, from the appearance of the flower-buds in spring before the leaves come out.

The wood is of the same colour and texture as the first.

Culture.—This is effected by sowing the seeds in the spring season, as about March, in beds of common ground, to the depth of half an inch. As soon as the plants appear, they should be kept clean, and occasionally watered, and when of sufficient growth be removed into the nursery, planting them in rows at the distance of one foot, and two feet between the rows. Having remained in this situation for two or three years, they become proper for planting out in the shrubbery.

They may be raised by layers and cuttings; but they seldom succeed so well in this way.

These are highly ornamental when planted out in the clumps, borders, and other quarters, among hardy, flowering, deciduous trees of other kinds.

CEREUS. See **CACTUS**.

CERINTHE, a genus which furnishes plants of the hardy, ornamental, flowering, annual kind. The Honeywort.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliceæ*.

The characters are: that the calyx is a five-parted perianthium; divisions oblong, equal, permanent: the corolla is monopetalous and bell-form: tube short, thick: border tube-bellied, rather thicker than the tube: mouth five-cleft; throat naked, pervious: the stamina consist of five, subulate filaments, very short: anthers acute, erect: the pistillum is a four-parted germ: style filiform, length of the stamens: stigma obtuse: there is no pericarpium: calyx unchanged: the seeds two, bony, glossy, subovate, outwardly gibbous, and bilocular.

The species cultivated is *C. major*, Great Honeywort.

It rises with stems eighteen inches high and more, round, smooth, branching, and leafy: the leaves are glaucous, becoming blue by age, smooth, without prickles, but ciliated about the edge, and dotted with white: the branches are leafy and nodding; with flowers among the leaves, hanging on long peduncles: the tube of

the corolla is yellow, but the border purple. It is a native of Italy, flowering in June and the two following months.

There are varieties with smooth leaves and purple flowers, and with prickly leaves and yellow flowers.

Culture.—The plants are raised by sowing the seeds annually in the autumn or early spring months in patches in the borders, clumps, or other parts. The autumn sowings should be made as early as possible. They also rise from the self-sown seeds. They should be managed as other hardy annuals. These are plants proper for being planted out about the apiary, or in the small beds or borders.

CESTRUM, a genus affording plants of the shrubby exotic flowering kind. Bastard Jasmine.

It belongs to the class and order *Petandria Monogynia*, and ranks in the natural order of *Luridae*.

The characters are: that the calyx is a one-leaved perianthium, tubular, columnar, obtuse, very short: mouth five-cleft, erect, obscure: the corolla monopetalous, funnel-form: tube cylindrical, very long, slender; throat roundish; border flat, plaited, five-cleft; divisions ovate, equal: the stamina consist of five filiform filaments, attached longitudinally to the tube, emitting a toothlet inwards at the middle: anthers roundish, quadrangular, within the throat: the pistillum is a cylindric-ovate germ, length of the calyx: style filiform, length of the stamens: stigma thickish, obtuse, scarcely emarginate: the pericarpium is an ovate berry, unilocular, oblong: the seeds very many, roundish.

The species are; 1. *C. nocturnum*, Night-smelling Cestrum; 2. *C. diurnum*, Day-smelling Cestrum.

There are other more tender species that may be cultivated.

The first rises with an upright stalk about six or seven feet high, covered with a grayish bark, and divides upward into many slender branches, which generally incline to one side, and are garnished with leaves placed alternate, near four inches long, and one and a half broad, smooth on their upper side, of a pale green, and on their under side they have several transverse veins, and are of a sea-green colour, having short foot-stalks: the flowers are produced at the wings of the leaves, in small clusters, standing upon short peduncles, each sustaining four or five flowers, of an herbaceous colour. They appear in August, but are not succeeded by berries in this climate. It is a native of the island of Cuba.

The second species rises with an upright stalk to the height of ten or twelve feet, covered with

a smooth light-green bark, dividing at top into many smaller branches, with smooth leaves near three inches long, and one and a half broad, of a lively green colour, and the consistence of those of the Spurge Laurel; these are ranged alternately on the branches. Towards the upper part of the shoots come out the flowers from the wings of the leaves, standing in clusters close to the branches; they are very white, shaped like those of the first sort, and smell sweet in the day-time, whence it had the appellation of Lady-of-the-Day. The berries of this are smaller than those of the first sort. It flowers in September, October, and November, and is a native of the Havannah.

Culture.—These plants are capable of being increased either by seeds or cuttings; but, as the former cannot be easily procured, the latter is the more common method.

The seeds should be sown in pots filled with light friable fresh earth in the early spring, and plunged into a gentle hotbed. When the plants are sufficiently strong they should be removed into separate pots, shade and a little water being given occasionally till they are well rooted again.

The cuttings should be made from the side shoots to the length of five or six inches, and planted in pots of fresh earth in the summer season, plunging them in a bark hotbed, a little water and shade being given till they have stricken root.

In both methods the plants require to be kept in pots filled with light earth in the stove.

From the evergreen flowery nature and fragrance of these plants, they afford pleasure and variety in assemblage with other stove exotics.

CHAMÆROPS, a genus comprising a plant of the perennial exotic kind. The Palmetto, or Dwarf Palm.

It belongs to the class and order *Polygamia Dioecia*.

The characters in the hermaphrodite flower are: that the calyx is an universal spathe, compressed, bifid: spadix branching: perianthium proper tripartite, very small: the corolla tripartite: petals ovate, coriaceous, erect, acute, inflexed at the tip: the stamina consist of six subulate compressed filaments, scarce cohering at the base: anthers linear, twin, growing to the interior side of the filaments: the pistillum has three roundish germs: styles as many, distinct, permanent: stigmas acute: the pericarpium three drupes, globose, unilocular: the seeds solitary and globose.

The male flower in a distinct plant, flowering in the same manner. The calyx and corolla as in the hermaphrodite: the stamina a gibbous receptacle, ending in six filaments not marked

by perforations. All the other particulars as in the hermaphrodites.

The species cultivated is *C. humilis*. Dwarf Fan Palm.

It never rises with an upright stem, but the foot-stalks of the leaves proceed immediately from the head of the root, and are armed on each side with strong spines; are flat on their upper surface, and convex on their under side: the centres of the leaves are fastened to the foot-stalk, and spread open like a fan, having many foldings, and at the top are deeply divided like the fingers of a hand: when they first come out they are closed together like a fan when shut, and are fastened together by strong fibres which run along the borders of the leaves; and when the leaves spread open these fibres or strings hang from the sides and ends: the orders of the leaves are finely sawed, and have white narrow edgings: they are from nine to eighteen inches long, and near a foot broad in their widest part. As the lower leaves of the plants decay their vestiges remain, and form a short stump above ground, in the same manner as our Common Male Fern: from between the leaves comes out the spadix or club, which sustains the flowers; this is covered with a thin spathe or hood, which falls off when the bunches open and divide. It grows naturally in Italy, &c.

Culture.—It is capable of being propagated by seeds and side-slips from the head of the root. In the first method, the seeds procured from abroad, should be sown in pots of light sandy earth, and plunged in a hotbed of tanners' bark, occasional waterings being given. In the autumn or spring following the plants will be in a proper state to be pricked out in separate pots. Much depends on having good seeds.

In the second method the slips of the crown of the roots or side off-sets should be separated with the root fibres, and planted out in pots filled with sandy earth, and plunged in a hotbed. The plants are stronger from seeds than when raised in this way.

In ten or twelve months the plants will be fit to be removed into other pots, which should be done in such a manner as not to injure their roots, as when that is the case they are liable to be destroyed.

They mostly require the protection of a stove while young; but when become hardy by gradual exposure to the air, they will succeed in a full exposure in summer, and in a greenhouse in winter; but must always be kept in pots of light sandy earth, and be frequently watered in summer, but more moderately when the weather is cold.

They afford variety in the stove collections.

CHAMEMOILE. See ANTHEMIS.

CHAMPIGNON. See AGARICUS.

CHANGEABLE ROSE. See HIBISCUS.

CHASTE TREE. See VITEX.

CHEIRANTHUS, a genus comprising plants of the herbaceous, annual, biennial, and perennial flowery kinds. Wall-flower and Stock Gilliflower.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliculosae*.

The characters are: that the calyx is a four-leaved compressed perianthium: leaflets lanceolate, concave, erect, parallel converging, deciduous; the two outer gibbous at the base: the corolla is four-petalled, cruciform: petals roundish, longer than the calyx: claws the length of the calyx: the stamina consist of six subulate filaments, parallel, the length of the calyx: two of them within the gibbous leaflets of the calyx, a little shorter than the other four: anthers erect, bifid at the base, acute at the tip, and reflected: a nectareous gland surrounds the base of the shorter stamens on each side: the pistillum is a prismatic germ, four-cornered, the length of the stamens, marked with a tubercle on each side: style very short, compressed: stigma oblong, two-parted, reflected, thickish, permanent: the pericarpium is a long compressed siliqua; the two opposite angles obliterated, marked with a toothlet, two-celled, two-valved, furnished with the very short style and the erect bifid stigma: the seeds are very many, pendulous, alternate, subovate, compressed, with a membranous edge.

There is a great number of species; but those mostly cultivated for ornament are: 1. *C. cheiri*, Common Wall-flower; 2. *C. incanus*, Queen's Stock Gilliflower; 3. *C. fenestralis*, Cluster-leaved Dwarf Stock Gilliflower; 4. *C. annuus*, Annual Stock Gilliflower, or Ten-week Stock; 5. *C. maritimus*, Dwarf Annual Stock Gilliflower, or Virgin Stock.

The first rises with a woody stem from a foot to two feet or more in height, ascending: the branches are angular: the leaves crowded, upright, lanceolate, with few serratures, smooth, and concave: the petioles hardly distinct from the leaves: the peduncles four-cornered. In garden culture the branches are wide and the leaves broad, with large flowers. It is a native of Switzerland, &c. flowering from April till June.

The chief varieties are the common dwarf yellow with a low bushy head, the large yellow with a branchy stem forming a bushy head, the large yellow bloody with a branchy head, the true bloody with a branchy stem, the narrow-

leaved straw-coloured, the variegated leaved yellow, the winter, and the white, having a very branchy greenish stem, and bushy head: the flowers in each single or double.

The second species rises with a strong stalk, which is almost shrubby, from a foot to two or more in height, having oblong, spear-shaped, hoary leaves, which are frequently waved on their edges, and turn downward at the extremity; from the stalk come out many lateral branches, with the same shaped leaves, but smaller; these side branches are each terminated by a loose spike of flowers, each having a woolly calyx, and four large roundish petals, indented at the end. These usually appear in May and June, but the same plants frequently continue flowering most part of the summer. The seeds ripen in autumn, and the plants often perish soon after; but in dry rubbish they last two or three years, and become shrubby. Those with single flowers are not worth preserving after they have perfected their seeds. It is a native of Spain, &c.

The flowers in this sort vary in their colour; some are of a pale red, others of a bright red, and some curiously variegated, but those of the bright red are generally most esteemed.

There are likewise other varieties, as the Scarlet or Brompton Stock, with a strong, upright, single stem, from one to three feet high, crowned by a cluster of long thick leaves and erect spikes of large scarlet single and double flowers.

The White Brompton Stock, with stem as above, and long erect spikes of large elegant flowers.

The Purple or Twickenham Stock, with a thick stem a foot and a half or two feet high, very branchy upwards, and all terminated by erect spikes of purple single and double flowers, purple blood-spotted single and double flowers, variegated purple and white flowers.

The Wall-flower² leaved or Shrubby Stock, with a shrubby firm stem from a foot to a yard high, dividing into many short branches, forming a bushy head, all terminated by erect spikes of pure white single and double very fragrant flowers, whitish-flesh-coloured flowers, whitish-purple flowers, whitish-red spotted flowers.

The third has a shrubby stem, from six to eight inches high, nearly the thickness of the little finger, straight, rigid, round, covered with leaves, hoary with nap, dividing at top into two or three very short alternate branches: the leaves are scattered, petioled, lanceolate, bending this way and that: the flowers alternate, nearly the size of those in the Common Stock, and of a purple colour. It flowers from May to July.

The fourth species rises with a round smooth stalk about two feet high, dividing into several

branches at top: the leaves are lanceolate, hoary, rounded at the end, almost opposite, or alternate, or three and four together of unequal sizes: the flowers are produced in loose spikes at the ends of the branches, and placed alternately. It is a native of the southern parts of Europe.

There are varieties with red, purple, white and striped single flowers, and with double flowers of the same colours.

The fifth species has the stems six or eight inches in height, very much branched, divaricated, somewhat stiff, rugged, with twin appressed hairs: the leaves are oval-lanceolate, somewhat reflected at the tip, green, on rather long petioles, stiffish; the upper ones obscurely subdentated: the branches terminated by spikes of red flowers, turning purple. It is a native of the coast of the Mediterranean, and improperly termed Virginia Stock.

Culture in the Wall-flower kind.—These plants may be increased by seeds, slips, or layers; but, in order to have good flowers, great care should be taken to have the seeds collected from the best plants: such as is purchased from the seedsmen can seldom be fully depended upon. The seed in this sort is less liable to produce double flowers than in the succeeding kind.

The seed should be sown in the spring, as in April or the following month, either in the situations where the plants are to remain, or on beds of earth that have not been enriched by manure, being covered lightly in. When the plants appear, frequent waterings should be given in dry weather; and when they have attained sufficient growth, where the bed method is practised, they should be thinned out during a wet season in the latter end of summer or beginning of autumn, and replanted in the situations where they are to flower, or be pricked out in nursery beds, nine inches distant, to remain till the following spring, to be removed with balls of earth about their roots; but the first is the most advisable method, as they do not succeed so well by removing. The bed method is chiefly in use with the market-gardeners, who cultivate the flowers for sale.

The slip mode is chiefly practised in perpetuating the fine double flowers. The slips are made from the side shoots that have no flowers, which, after being divested of their lower leaves, are planted in the situations where they are to remain, or in beds, to the depth of three or four inches, any time from April to May, slight waterings and shade being given. In the autumn those in the beds should be removed into separate pots, to have the occasional protection of a frame in the winter.

The young, tender, and pliable branches may be laid down any time from May till the end of June, a little water being occasionally given when the weather is dry. These should be taken off when they are well rooted, and be planted out either where they are to remain or in pots.

These two last methods, however, seldom afford plants that have so good flowers as those raised from seed, being weaker and furnished with shorter spikes of flowers. They should therefore be chiefly confined to those varieties that cannot be raised with certainty from seed.

When these plants are intended for the purpose of ornamenting and affording variety on walls, ruins, or other places of this sort, the seed should constantly be sown upon them in the autumn or early spring, covering it in with a little earth to the depth of half an inch. They will afterwards propagate themselves by shedding their seed, and continue for a great length of time.

When cultivated in the vicinity of large towns, for the purpose of sale, it is the practice, especially with the market-gardeners around London, to prick the young plants out of the seed-beds into nursery-rows at the distance of ten or twelve inches, and nine or ten from plant to plant; and where they grow too luxuriantly in these situations they are again removed about August, in order to check their too full growth, and by that means render their heads more bushy. They are usually exposed for sale, with small balls of earth about their roots, when just beginning to put forth bloom, so as that their colours and the properties of their flowers can be discerned.

Where a blow of the double seedling sort is desired, they should be placed in pots, with balls of earth to their roots, as soon as their double-flower-buds appear, giving them a little water and proper shade till they become established again.

These plants succeed best and continue longest where the soil is of the poor and rather calcareous kind.

Culture in the Stock Gilliflower kind.—This may be performed exactly in the same manner as in the Wall-flower sort, only the seed should always, as much as possible, be sown where the plants are to remain, or the plants be pricked out into them while they are very young, as in their more advanced growth they never succeed well when removed, or are of so long duration, as their roots are sticky and but slightly provided with fibres. When the removal of the plants is practised at a late period, it should constantly be done with large balls of earth to their roots.

And in the slip and layer methods, as practised for the varieties, the plants seldom grow so freely or become so fine as those raised from seed. The soils on which they are found to succeed the best, are such as are fresh, and which have not been enriched by manure.

Both these species and their varieties, in order to have a good show of flowers, and the best and most perfect plants, should be raised annually in the different modes, as, in whatever way they are increased, they always afford the finest flowers the first season of their complete flowering.

And such of the double sorts of the different kinds as have been potted should be protected during the winter season, either in frames for the purpose or some other contrivance.

To have good flowers of this sort great care should be taken to remove all the small and imperfect flowers from the seed beds at the time of setting them out.

Culture in the Annual Stock kind.—In these plants it is accomplished by sowing the seeds at suitable times, so as to produce successions of flowers during the summer and autumn, from the beginning of February till the latter end of May, covering the seed in lightly. The first and second sowings should be made on a very gentle hotbed, or in pots placed in it, or in frames, to be protected in the night; but the others may in general be performed in the places where the plants are to flower, or in beds, to be afterwards pricked out or removed into pots or where they are to remain and blow. The former is, however, the best practice where it can be employed, as removing always injures the growth of the plants. In sowing and planting them out in the borders or other parts of pleasure-grounds, it is usual to put them in in patches of five or six in each patch, disposing them in a varied manner.

The plants of the early sowings will mostly be in a state to be planted out in pots or on the borders in the beginning of May, a little water being given when the weather is dry. They are always proper to be set out when they have attained three or four inches growth, and have several leaves.

When these plants are raised by themselves for show, it is the practice to plant them in rows in beds four feet wide, ten or twelve inches apart each way, care being taken to keep them clear from weeds, and duly watered in dry weather.

To have these plants to flower in the autumn and winter, some of them should be potted about the latter end of July, and placed in a warm situation, occasional waterings being given;

and in the beginning of autumn, removed under the protection of the greenhouse or garden-frames.

Much caution is necessary in the culture of these flowers, not only to choose good seed, but to remove all the bad and imperfect plants as soon as possible from the beds or other places where they are grown.

The fourth species may likewise be increased by sowing the seeds at different times, as in the above sort, chiefly in the places where they are to flower, and a few in pots for being set out with others of similar growth.

The fifth sort is propagated and managed in the same methods as the two first.

In order to provide good seed of the three first species, great attention should be paid to have it collected from those single plants which have the largest flowers with the deepest and brightest colours. Some suppose it advantageous to take it from such plants as have rather a tendency to the double kinds. The branches should be separated when dry, as the seeds become perfectly ripened, and be tied up in small bunches, and hung up in a dry airy situation till the seed is fit to be rubbed out and put up for use.

In the two last species nothing further is necessary but to take it, when perfectly ripened, from the best plants of the respective kinds.

All the species and varieties are highly ornamental, but particularly the double-flowering sorts, being introduced not only in the more open exposures of the clumps and borders of the pleasure-grounds and gardens, where variety is wanted, but in other places contiguous to the house for the delightful smell they afford.

The last species is sometimes made use of as an edging, and the third as an ornamental plant in windows.

CHELIDONIUM, a genus furnishing a plant of the hardy herbaceous flowery kind.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rhoeadeæ*.

The characters are: that the calyx is a two-leaved roundish perianthium: leaflets subovate, concave, obtuse, caducous: the corolla has four roundish flat petals, spreading, large, narrower at the base: the stamina consist of very many filaments (thirty), flat, broader at top, shorter than the corolla: the anthers are oblong, compressed, obtuse, erect, and twin: the pistillum is a cylindric germ, the length of the stamens: there is no style: the stigma headed and bifid: the pericarpium is a cylindric silique, sub-bivalve: the seeds very many, ovate, increased, and shining: the receptacle linear, between the valves of a kind of circumambient suture, not gaping.

The species worthy of cultivation as an ornamental plant is *C. glaucum*, Sea Celandine, or Yellow-horned Poppy.

It has a strong stem: the root-leaves are pinnatifid, waved, variously lobed, and indented; pinnas gradually larger upwards; hairy on both sides: stem-leaves embracing, deeply indented, rough above, smooth beneath: the branches are dichotomous: the flowers are of a scarlet colour, and succeeded by long horn-shaped pods. The root, according to some, is annual, but others assert it to be perennial.

Culture.—These plants are raised from seed, which should be sown either in the autumn or spring where the plants are to remain; or they may be raised in a seed-bed, and be afterwards planted out where they are to flower. Some seed should be sown annually, as the plants seldom continue longer than two years. It is hardy, and succeeds in almost any soil or situation.

The plants afford ornament and variety in the borders both from their flowery nature and the peculiarity of their long-horned pods.

CHELONE, a genus comprehending plants of the flowery herbaceous perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved, five-parted, very short, permanent perianthium: divisions erect and ovate: the corolla monopetalous and ringent: tube cylindric, very short: throat inflated, oblong, convex above, flat beneath: border closed, small: upper lip obtuse, emarginate; lower almost equal to the upper, very slightly trifid: the stamina consist of four filaments, hid beneath the back of the corolla; the two side ones a little longer: the anthers incumbent: the rudiment of a fifth filament, like the point of a dagger, between the upper pair of stamens: the pistillum is an ovate germ: style filiform, situation and length of the stamens: the stigma is obtuse: the pericarpium is an ovate capsule, two celled, longer than the calyx: the seeds very many, roundish, surrounded with a membranous rim.

The species cultivated for ornament are: 1. *C. glabra*, White Smooth Chelone; 2. *C. obliqua*, Red Oblique-leaved Chelone; 3. *C. hirsuta*, Hairy Chelone; 4. *C. penstemon*, Forking Chelone.

The first has a pretty thick jointed root, which creeps under ground to a considerable distance, sending up smooth channelled stalks, which rise about two feet high, with two leaves at each joint, standing opposite without foot-stalks; these are three inches and a half long, and about three quarters of an inch broad at their base,

where they are broadest, diminishing gradually to a sharp point; they have small serratures on their edges, which scarcely appear. The flowers grow in a close spike at the end of the stalks; are white, and almost like those of the Foxglove. It is a native of North America.

According to some, it varies with white flowers, with rose-coloured flowers, with red flowers, and with purple flowers.

In the second species, the roots do not creep so far as those of the first: the stalks are stronger, the leaves much broader, and oblique; they are deeply sawed on their edges, and stand upon short foot-stalks: the corolla is of a bright purple colour, and consequently makes a finer appearance than the above sort. It is a native of Virginia.

The third species resembles the first; but the stalks and leaves are very hairy, and the flower is of a purer white. It is a native of New England.

Some assert this to vary with white flowers, with blue flowers, with red flowers, and with purple flowers.

The fourth has a cylindric, pubescent, upright stem, a foot and half high, putting out several side branches: the leaves are oblong-lanceolate, ending in a point: the flowers in short loose spikes from the divisions of the stalks, and of a purple colour. It is a native of North America.

They all flower in the autumn, from September to November.

Culture.—The mode of propagation in the three first species is by the roots, which multiply easily, being parted in autumn, or early in spring, and planted where they are to remain: but the fourth sort must be raised annually from seed, by sowing it in autumn as soon as perfectly ripened.

The plants rise the following spring, and may be planted out in the borders during the summer months. They are hardy plants, and succeed in most soils and situations.

All these plants have a very ornamental effect for some time in autumn, after the principal bloom of most others is over; and, from being of different colours, produce much variety when planted in the borders of pleasure-grounds.

CHENOPODIUM, a genus comprising plants of the hardy herbaceous ornamental kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Holocaracæ*.

The characters are: that the calyx is a five-leaved perianthium, concave, permanent: divisions ovate, concave, membranaceous on the margin: there is no corolla: the stamina consist of five subulate filaments, opposite the leaves of the calyx, and of the same length: anthers roundish,

twin: the pistillum is an orbiculate germ: the style two-parted, short: stigmas obtuse: there is no pericarpium: the calyx closed, five-cornered, five angled; (angles compressed) deciduous: the seed single, lenticular, and superior.

The species most worthy of cultivation for ornament are: 1. *C. Scoparia*, Flax-leaved Goose-foot, Belvidere, Summer, or Mock Cypress; 2. *C. Botrys*, Cluster-leaved Goose-foot, or Oak of Jerusalem: 3. *C. Ambrosioides*, Mexican Goose-foot, or Oak of Cappadocia.

The first rises with upright round stalks, closely branching pyramidally from the bottom upwards, to the height of two or three feet, set with very narrow, linear, spear-shaped, plane, entire green leaves, and spikes of small greenish flowers. It is a native of Greece, flowering in July.

The second species sends up several stems from the root, which rise about two feet high: the leaves are light green, and alternate: the flowers axillary from the upper part of the branches, in loose racemes. They appear in July, and the seeds ripen in September. The leaves emit a very strong odour when bruised, somewhat like that of Ambrosia. It is a native of the South of Europe.

The third has the stem from twelve to eighteen inches high, sometimes reddish, round, striated, with fine scattered hairs: the leaves are pale green, oblong, sinuated; at the base of each, peduncles an inch long, on which are several little heads of flowers alternately disposed, with a leaflet under each. It is a native of Mexico.

Martyn says that "the leaves and flowery heads of both these plants have a strong and not unpleasant smell, and a moderately aromatic taste, somewhat bitterish."

Culture.—These sorts are all readily raised from seed sown in the full ground in March, on a bed of rich light earth, and raked in lightly. When the plants are two or three inches high, they may be planted out singly in different parts of the borders; but it is probably a better practice to put the seed in in patches where the plants are to flower, thinning them afterwards to a single plant in each place. In the first sort, some plants may also be planted in pots, to be set out in assemblage with other potted annuals: and a few plants of the other two sorts may be treated in the same way, in order to move them to the shelter of a greenhouse or garden-frame.

The shrubby sorts have but little beauty.

CHERRY TREE. See PRUNUS.

CHERRY-LAUREL. See PRUNUS.

CHESTNUT. See FAGUS.

CHESTNUT, HORSE. See *Æsculus*.

CHINA PINK. See *Dianthus*.

CHINA ROSE. See *Hibiscus*.

CHIOCOCCA, a genus containing a plant of the ornamental flowering shrubby exotic kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a five-toothed, superior, permanent perianthium: the corolla monopetalous, funnel-form: tube long, spreading: border five-parted: divisions equal, acute, reflected: the stamina consist of five filiform filaments, length of the corolla: anthers oblong, erect: the pistillum is an inferior, roundish, compressed germ: style filiform, length of the stamens: stigma simple, obtuse: the pericarpium is a roundish berry, compressed, crowned with the calyx, one-celled: the seeds two, roundish, compressed, and distant.

The species chiefly cultivated is *C. racemosa*, Climbing Snowberry Tree.

It rises with a climbing, branchy stem, several feet high, garnished with broad spear-shaped leaves, and flowers in a raceme, succeeded by numerous white berries of a loose texture.

There is a larger variety with smaller leaves and pale-coloured flowers.

Culture.—These plants may be raised by layers or cuttings of the young branches, which should be laid down or planted in pots during the summer months; and when well rooted, be taken off and planted in other pots, or removed into larger ones, a little water being given when the different operations are performed.

They afford ornament and variety when placed in assemblage with other stove plants.

CHIONANTHUS, a genus containing a plant of the deciduous flowering shrubby kind.

It belongs to the class and order *Diandria Monogynia*, and ranks in the natural order of *Scapariæ*.

The characters are: that the calyx is a one-leaved perianthium; four-parted, erect, acuminate, permanent: the corolla is monopetalous, funnel-form: tube very short, length of the calyx, spreading: border of four divisions, which are linear, erect, acute, oblique, most extremely long: the stamina consist of two very short subulate filaments, inserted into the tube: anthers cordate, erect: pistillum is an ovate germ: style simple, length of the calyx: stigma obtuse, trifid: the pericarpium is a one-celled, round drupe: the seed is a striated nut.

The species cultivated is *C. Virginica*, Virginia Snowdrop, or Fringe Tree.

It rises in its native situation with a rough

stem, about ten feet high: the leaves are as large as those of the laurel, but of a much thinner substance; the flowers come out in May, hanging in long bunches, and are of a pure white: hence it is called Snowdrop Tree; and, from the flowers being cut into narrow segments, Fringe Tree. After the flowers have fallen away, the fruit appears, which is a dark-coloured drupe, about the size of a sloe. It is a native of South Carolina.

There are varieties, with broader, or ovate-elliptic, and with narrower, or lanceolate leaves.

Culture.—The method of propagation in this shrub is either by seed or layers of the young branches: the latter is a tedious method, as the branches do not easily strike root.

The seed should be procured from America, and sown as soon as it arrives in large pots of fresh loamy earth, half an inch deep, plunging them in a shady border, keeping them free from weeds, and giving occasional waterings, till autumn, when they should be moved to a frame, or where they can be occasionally sheltered during hard frost in winter; and in March plunged into a hot-bed, to bring them up.

The plants should afterwards be hardened gradually to the full air, and occasional shade be given from the mid-day sun at their first appearance, and water during summer, being sheltered again in the autumn and winter, when they may be pricked out separately in small pots; and after managing them in the same way another year or two, be planted out in the full ground.

The layers should be made from the young twigs of the last summer's growth; and as they emit roots reluctantly, a slit or twist should be given at the part laid in the earth, watering them well during summer, and in two years some may be rooted, so as to be taken off, and planted out.

It is a most beautiful ornamental shrub for the plantations of pleasure-grounds, and prospers in any common soil, though it is said to delight most in that of a somewhat moist loamy nature. It should be placed conspicuously, and so as to have the shelter of other shrubs, that there may be a more plentiful bloom.

CHIRONIA, a genus comprising plants of the exotic shrubby green-house kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-parted, erect, acute, permanent, one-leaved perianthium: leaflets oblong: the corolla monopetalous, equal: tube narrower: border five-parted, spreading: divisions ovate, equal: the stamina consist of five broad, short filaments, growing

from the tip of the tube: anthers oblong, erect, large, converging, and (after having shed the pollen) spirally twisted: the pistillum is an ovate germ: style filiform, a little longer than the stamens, declinate: stigma headed, ascending: the pericarpium is ovate and bilocular: the seeds numerous and small.

The species cultivated for ornament are: 1. *C. baccifera*, Berry-bearing Chironia, or Centaury; 2. *C. frutescens*, Shrubby African Chironia.

The first grows to the height of a foot and half, or two feet, with a quadrangular stem, and becomes very bushy, having beautiful red flowers at the ends of the branches.

It produces both flowers and fruit during most of the summer months, and sometimes ripens seeds, which are of a dark chesnut colour. It is a native of Africa.

The second species has the stem dividing above into round branches, tomentose, ash-coloured, mostly alternate, subdividing a little at top: the leaves are opposite, obtuse, fleshy, about two inches in length, sessile, frequently twice as long as the internodes: the peduncles two or three together, terminating, each having two or three bright purple flowers arising from the axils, with a pair of linear folioles in the middle: the pedicels one-flowered. It is a native of Africa.

Culture.—The plants in these different species may be raised from seeds, which should be sown in small pots of light sandy earth, plunging them in a moderate hot-bed: when they have attained some growth, air should be admitted pretty freely. It is the practice with some to remove them into other pots; but when they are suffered to remain in those in which they were sown, till they become large, they make the stronger plants. They should be afterwards gradually exposed to the open air, to be hardened, being placed in sunny situations with other plants that require little moisture. In the winter they should have the protection of a dry and airy green-house, and be very sparingly watered.

They may likewise be increased by cuttings planted in pots of the same sort of earth in the spring, aided by the assistance of a hot-bed, and the same kind of management as in the former mode.

In these methods of management they mostly flower the second year, and afford much ornament and variety among other curious plants of the exotic kind.

CHRISTMAS ROSE. See HELLEBORUS.

CHRIST'S THORN. See RHAMNUS.

CHRYSANTHEMUM, a genus containing

plants of the flowering herbaceous annual and perennial, as well as the shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common hemispherical, imbricate: scales close incumbent; the interior ones larger by degrees; the innermost terminated by a parched scale: the corolla compound radiated: corollets hermaphrodite tubular, numerous, in the disk: females more than twelve in the ray: proper of the hermaphrodites funnel-form, five-cleft, patulous, length of the calyx: of the females strap-shaped, oblong, three-toothed: the stamina, in the hermaphrodites, filaments five, capillary, very short: the anthers cylindric, tubular, shorter than the corolla: the pistillum, in the hermaphrodites, an ovate germ: style filiform, longer than the stamens: stigmas two, revolute: in the females, an ovate germ: style filiform, equal with the hermaphrodites: stigmas two, obtuse, revolute: there is no pericarpium: the calyx unchanged: the seed solitary, oblong, without any pappus: the receptacle naked, dotted and convex.

The species cultivated for ornament are, chiefly, 1. *C. coronarium*, Annual Garden Chrysanthemum; 2. *C. serotinum*, Late-flowering Creeping Chrysanthemum; 3. *C. Monspelienae*, Montpellier Chrysanthemum, or Ox Eye; 4. *C. corymbosum*, Corymbed Chrysanthemum; 5. *C. frutescens*, Shrubby Canary Chrysanthemum, or Ox Eye; 6. *C. flosculosum*, Bastard Shrubby Chrysanthemum.

The first has a furrowed stem, leafy, branching, three feet high: the leaves are smooth, stem-clasping; pinnae either pinnate or pinnatifid, the end one very large, bifid, with the pinnales sharply gashed: the peduncles terminating, one-flowered: the flowers of different colours. It is a native of Sicily, &c.

The second species has a perennial creeping root: the stem strong, branched, erect, somewhat villose, three or four feet high: the leaves are sessile, smooth; on some plants with many acuminate serratures beyond the middle, on others very few towards the end only, others again quite entire: the flowers on the ends of the branches of a white colour, appearing in September.

The third is an elegant perennial plant, without scent, and is very smooth and slightly villose, with erect, branching stems, three or four feet in height: the lower leaves bipinnatifid, upper pinnatifid, one or two at top quite entire: the flowers large, white, and radiated, like those of the above.

The fourth species is perennial, having an erect stem, from eighteen inches to two or three feet high, or more: the leaves are alternate, pinnas pinnate to the middle, the segments sharply toothed: the stalks are terminated by corymbs of large white flowers. The whole plant is without smell or taste, flowering in July and August. It is a native of the South of France, &c.

The fifth has a shrubby stem, near two feet high, dividing into many branches: the leaves are of a grayish colour, cut into many narrow segments: the flowers axillary, standing upon naked peduncles singly, and greatly resembling those of common Chamomile. There is a succession of these for a great part of the year, for which it is chiefly esteemed. It is a native of the Canary Islands.

The sixth species is a procumbent, evergreen undershrub, two feet in height: the leaves obovate, gradually narrowing into the petiole, sinuate-toothed and stiffish: the flowers small, terminating, solitary, and of a deep yellow colour. It is a native of the Cape of Good Hope.

There are varieties with single and double flowers, both white and yellow; with fistular florets, termed Quill-leaved Chrysanthemum.

Culture.—The first or annual kind may be propagated either by seeds or cuttings, but the latter method is the more expeditious, and of course more commonly practised.

In the first mode the seed should be sown in the early spring months on a very moderate hot-bed, or under hand glasses, and continued so late as the latter end of April, in a sunny situation in the open ground. It may be put in in small drills or on the surface, the mould being previously made fine and even, and the seed sown thin, and evenly covered in to the depth of nearly half an inch. When the plants are of sufficient growth, as in May, or the following month, they may be planted out singly in the situations where they are to flower. A little water should be occasionally given, both while in the beds and when planted out, especially when the weather is dry in the latter case.

In order to have fine double sorts, care should be had to remove all the bad flowers from about them as soon as they can be ascertained, leaving only one or two good ones in a place; and to have them fine in pots, they should be removed into them as soon as they can be known, with large balls of earth about their roots, a little water being given at the time.

In the latter method, which is constantly employed for continuing the double sorts so that they may blow early in the succeeding summer, cuttings of the strong side shoots about three inches long, which have not flowered, should

be planted in large pots near the tops, not too nearly together, in the early autumnal months, as the latter end of September, a little water being given at the time; the pots being removed into a frame or green-house for protection during the winter, and air freely admitted in proper weather. About the beginning of April they should be removed from the pots into the situations where they are to flower, being planted out singly. In this culture they flower much earlier than when raised from seed.

Some plants should however always be raised from seed, in order to afford cuttings to increase the double sorts from, and thereby avoid their degenerating.

The seed made use of should constantly be collected from the best and most full double flowers.

The three following species are capable of being increased either by sowing the seeds in March in beds of fine mould, in warm sunny situations, or by dividing the roots and planting them out in the autumnal months, when the season is open and rather moist. The plants in the former of these modes should be transplanted into other beds in the latter end of summer, and set out to the distance of ten or twelve inches, in order to be removed in the autumn following into the places where they are to flower.

The two last species are easily increased by planting cuttings of the young branches in pots filled with good rich earth, any time during the spring or early summer months, proper shade and water being given. When the plants are well rooted in the beginning of the autumn, they should be removed and planted in separate pots, and during the winter placed under the protection of a deep garden frame or green-house.

The first sort affords plants well suited for ornament in the beds or borders of pleasure-grounds or other places, as they produce many flowers and continue late in the autumn; and though they are annual when produced from seeds, the cuttings, as has been seen, when planted out in the autumn continue the winter, and flower earlier in the ensuing summer than the plants raised by seed.

The three following sorts are proper for the borders of extensive ornamented grounds, as they produce an agreeable variety a considerable length of time in autumn, and are of a large as well as hardy growth.

The two last are adapted for green-house collections, where they afford variety among other potted plants.

CHRYSOBALANUS, a genus containing a plant of the exotic tree kind. The Cocoa Plum.

It belongs to the class and order *Teasandria*

Monogynia, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved, bell-shaped, five-cleft perianthium, divisions expanding; withering: the corolla has five petals, oblong, flat, spreading, inserted by their claws into the calyx: the stamina consist of very many stamens, placed in a circle, erect, inserted into the calyx: anthers small, twin: the pistillum is an ovate germ: style of the shape and length of the stamens; inserted laterally at the base of the germ: stigma obtuse: the pericarpium is an ovate drupe, large, one-celled: the seed a nut ovate, marked with five furrows, wrinkled, five-valved.

The species cultivated is the *C. Icaco*, Cocoa Plum.

It is an irregular shrub, from three to ten feet high, covered with a ferruginous bark with pale spots: the leaves ovate-roundish, obtuse, entire, coriaceous, shining, on very short petioles, alternate, two inches long: racemes branched, corymbed, lax, terminating and axillary, short; the last common peduncles three-flowered: the flowers are inodorous, small, with white petals, having almost the character of the plum: fruits roundish, about an inch in diameter, either quite entire, or with five, six, or seven grooves; red, purple, yellow, whitish, or variegated, but never blue, as described by Catesby. It is a native of the Caribbee Islands.

There are two varieties of this with compound leaves, and of tall shrubby growth.

Culture.—These plants are increased by planting the stones or nuts of the fruit procured from abroad in pots of light earth in the early spring, plunging them in a very moderate hot-bed, occasional waterings being given. When the plants are of proper growth, as three or four inches in height, they should be removed and put in other pots of a small middling size, separately, being re-plunged in the hot-bed, proper shade and moisture being given till they become perfectly rooted.

They must be kept constantly in the heat of the stove, and managed as other exotics of the same kind; water should be given them frequently during the summer months, but only in small proportions at a time. In winter it should be very sparingly employed, lest it make them throw off their leaves.

They afford variety in the hot-house collections.

CHRYSOCOMA, a genus comprising plants of the flowery herbaceous perennial and shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Æqualis*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common hemispherical, imbricate; scales linear, outwardly convex, acuminate: the corolla compound tubular, longer than the calyx: corollæ hermaphrodite, tubular, numerous, equal. Proper funnel-form: border five-cleft, revolute: the stamina consist of five filaments, filiform, very short; anthers cylindric, tubular: the pistillum is an oblong germ, crowned: style filiform; scarce longer than the florets: stigmas two, oblong, depressed, involute: there is no pericarpium: calyx scarcely changed: the seeds are solitary, ovate-oblong, compressed: pappus hairy: the receptacle is naked, flat.

The species cultivated are: 1. *C. Linosyris*, German Goldy Locks; 2. *C. comauera*, Great Shrubby Goldy Locks; 3. *C. cornua*, Small Shrubby Goldy Locks.

The first has a perennial root: the stalks rise two feet and a half high, are round, stiff, and closely garnished with long, narrow, smooth leaves, which come out without any order, of a pale green colour: the upper part of the stalk divides into many slender peduncles, each sustaining a single head of flowers, of a bright yellow colour, and disposed in form of an umbel. The plant, when handled, affords a very fine aromatic smell. It is a native of Germany.

The second species rises with a ligneous stalk, about a foot high, dividing into many small branches, which are garnished with narrow leaves, of a deep green, coming out on every side without order: the back part of each leaf has a small short appendix, which runs along the stalks: the flowers are produced at the end of the branches, on slender naked foot-stalks, and are of a pale yellow colour. It flowers a great part of the year, and the seeds ripen well in autumn. It is a native of the Cape.

The third is a less plant than the above; it has a shrubby stalk, branching out in the same manner: the leaves are shorter, and a little hairy: the flowers are not half so large, of a pale sulphur colour, and nod on one side before they are blown. It flowers a great part of the year, and ripens seeds well. It is a native of the Cape.

Culture.—The first species may be raised by sowing the seed in a bed of light mould during the early spring months, or by dividing the roots, and planting them out in rather moist open weather in the autumn.

The other sorts may be increased by planting cuttings of the young shoots in pots of light rich earth in the spring or summer months, plunging them in a slight hot-bed, or covering them with hand glasses till they have stricken root. They may afterwards be planted out in separate pots.

The first sorts are capable of being employed in the shrubbery, borders, and the latter in the green house.

CHRYSOPHYLLUM, a genus containing a plant of the exotic tree kind. Golden Leaf or Star Apple.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumoseae*.

The characters are: that the calyx is a five-parted, small perianthium: leaflets roundish, obtuse, permanent: the corolla monopetalous, bell-shaped: border five-cleft (ten-cleft): segments roundish, very much expanded, shorter than the tube: the stamina consist of five filaments, subulate, placed on the tube, converging: anthers roundish, twin, incumbent: the pistillum is a roundish germ: style very short: stigma obtuse, subquincifid: the pericarpium is a globular berry, ten-celled, large: the seeds solitary, bony, compressed, marked with a scar, and shining.

The species cultivated is *C. Cainito*, Broad-leaved Star Apple.

It has a woody, branching stem, growing many feet high in its native situation, having spreading, slender, declining branches, garnished with alternate spatulate leaves, quite entire, downy underneath, satiny and gold-coloured; and bunches of flowers which are succeeded by large globular, eatable fruit.

It varies with different coloured fruits, as reddish, purple, and blue.

Culture.—These plants are increased by sowing the seeds, procured from the native situations of the plants, in pots filled with light good mould, in the spring, plunging them in a tan hot-bed. When the plants have attained a few inches in height, they should be planted out singly into other pots, a little water being given at the time, with a due degree of shade, and the pots replunged into the hot-bed. They should afterwards have water in moderate proportions, when necessary, and sufficient shade; being kept constantly in the hot-bed of the stove. And as they increase in size, they must be removed into larger pots, and have the management of other tender exotic plants.

These plants produce a fine effect in the stove, from the singularity of their leaves, but they seldom flower.

CIBOULS. See **ALLIUM**.

CICHORIUM, a genus comprising a plant of the herbaceous esculent kind. Succory or Endive.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Compositae Semiflosculosae*.

The characters are: that the calyx is common calycled cylindric: scales eight, narrow-lanceolate, equal, forming a cylinder; and five others incumbent and shorter: the corolla compound flat, uniform: corollules hermaphrodite twenty, in a ring: proper monopetalous, ligulate, truncate, deeply five-toothed: the stamina consist of five capillary filaments, very short: anther cylindric-pentagon, tubulous: the pistillum is an oblong germ: style filiform, the length of the stamens: stigmas two, revolute: there is no pericarpium: the calyx cylindric, converging at top: the seeds solitary, compressed, with sharp angles: pappus obscurely hairy, slightly five-toothed (many-leaved, and as it were composed of a double row of leaves): the receptacle somewhat chaffy.

The species cultivated for culinary use is *C. Endivia*, Broad-leaved Endive, or Succory.

It has an herbaceous, annual stem, two feet high, upright, round, thick, and branched: the root-leaves many, large, subcuneiform, sinuate-toothed, smooth on both sides: the uppermost lanceolate and small, of a whitish green colour, thick and crisp, like coss lettuce: the flowers are pale blue, solitary, and peduncled. It is at most a biennial plant; but if the seeds be sown in the spring, they will flower and produce seeds the same year, and perish in the autumn. This is more proper for culinary uses than sallads, and not so hardy as the green curled variety: it is mostly cultivated only for autumn use. It is a native of China and Japan.

There are other varieties, as with green curled leaves, which form a circular cluster close to the ground, twelve or fifteen inches in diameter; the centre leaves being numerous, very closely placed, and growing to a large, compact, finely-blanchd, white heart. This is a fine hardy variety, mostly cultivated for sallads and other culinary purposes. But the great point is, to have the true sort; as some have long, irregular, thinly-placed leaves, very little curled, and the heart open and loose. In saving seed, the fullest-leaved, most curly, regular, bushy plants, that bottom well, and have the heart perfectly full, close, and white, should therefore be chosen; the white curled, which is smaller, having white, very fringy, curled leaves, in a circular cluster close to the ground, ten or twelve inches in diameter, very full and close in the heart.

Culture.—These plants are raised from seed, which should be sown at different times, from the beginning of June to the end of the following month, upon beds of fine rich mould. And some, in order to have very early plants, make a sowing about the middle of May. But, when the sowings are made too early, the plants are

apt to run to seed; and when they are deferred too long, they do not attain a sufficient growth before they are set out.

All these separate sowings should be performed in as open exposures as possible, the ground being prepared by digging it over into proper beds, and reducing the earth well at the time. The seed should then be sown thinly over the surface, and lightly raked in. In the light sorts of soil, it is the practice of some to tread it in.

Occasional slight waterings should be given when the weather is dry, and the plants kept clear from weeds, and properly thinned, so as not to draw up too fast. When they are of sufficient growth, as from four or five to six inches in height, they should be planted out where they are to remain; which for the more early plantings should be as open as possible; but for the later crops, the more southern sheltered aspects should be preferred.

For this purpose, the ground should be rich and mellow, being formed into beds about four feet in width, by digging over to a good spade's depth: a line should then be extended the whole length; and the plants, after being taken up with their roots as perfect as possible, and their tops and roots trimmed when necessary, be set out in rows, ten or twelve inches distance each way, by means of a dibble, a good watering being given immediately afterwards, when the season is dry. In this mode each bed will contain four rows of plants. But they may be planted without having the land formed into beds: the raised bed method is however preferable, especially for the winter crops, and where the soil is inclined to moisture, as keeping the plants more free from stagnant wetness, and preventing their rotting in the winter. In these cases they are often planted at smaller distances, as six or eight inches. Some likewise, for the late crops, form a sort of banks, sloping towards the south, having the breadths of four or five feet, in which the plants are set out in rows as above. In this way the plants stand more dry, and are capable of being protected by frames and mats with greater facility, when the severity of the winter renders it necessary. Where they have been set out close in these cases, some may be drawn out in such a manner as to leave the rest standing at the proper distance, which may be planted again in a warm border about February. When plants of this sort are set out in dry weather, it is a good method to make shallow drills, in order that the moisture may be more perfectly retained.

Crops should be planted out in some of these methods every fortnight or three weeks, from

about the middle of June till the beginning of October, or later; by which means they will come forward in perfection, from the later summer months till the spring following.

The only culture that is afterwards necessary, is merely that of keeping the plants free from weeds, by proper hoeing; and when they have attained their full growth, tying them up, in order that they may be effectually blanched, and rendered sweet and tender.

Blanching the plants.—This depends almost wholly upon the hearts of the plants being kept perfectly secluded from the action of light, which has been attempted in many different methods, as by tying up the leaves of the plants close together with pieces of bass; by earthing the plants well up; by placing plane tiles or boards flat upon them, and by transplanting the full-sized plants into the sides of raised ridges, putting them in the earth nearly up to their tops. The two first modes are chiefly employed in the autumn and spring crops, and the last in the winter.

The two first are the most effectual methods when performed in a perfect manner, as, while they render them quite white and crisp in a regular manner, they do not cramp or restrain their growth: the latter is chiefly to be employed in dry soils, and should be done at two or three different times.

In the third, the hearts are rendered sufficiently white and tender, but the growth of the plants is too much restricted, and the business is not performed in so regular or effectual a manner. The last is useful, when there is danger of the plants rotting, by an excess of moisture. In whichever way the etiolation of these vegetables is performed, it should constantly be done when the plants are quite dry, in the middle of a fine day, as, when done while they are wet, much loss and injury is sustained by their rotting. They mostly become well blanched in the course of a fortnight, or sooner where the light has been wholly excluded.

In very severe winters, it is of great use to cover the plants with some light material, so as to prevent their rotting, and being destroyed.

These plants may be well preserved in this season, also by being placed in dry sand, in a shed, cellar, or other convenient place.

In saving the seed of these plants, great care should be taken to collect it from the best and most perfect of the different varieties, and to have it perfectly ripened, as without care in this last respect it never answers well as seed.

CINERARIA, a genus furnishing plants of the herbaceous and shrubby kinds for the greenhouse.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common simple, many-leaved: leaflets equal: the corolla compound radiated: the corollets hermaphrodite, equal, numerous in the disk: female ligulate, the same number with the leaves of the calyx, in the ray: proper of the hermaphrodite funnel-shaped, with an erect, five-cleft border: female ligulate, lanceolate, toothletted at top: the stamens in the hermaphrodite, filaments five, filiform, short: anther cylindric, tubulous, five-cleft at top: the pistillum in the hermaphrodite is an oblong germ: style filiform, the length of the stamens: stigmas two, almost erect: females, germ oblong; style filiform, short: stigmas two, oblong, bluish, revolute: there is no pericarpium: calyx unchanged: the seeds solitary, linear, and quadrangular: pappus hairy, copious: the receptacle naked, and flattish.

The species are: 1. *C. maritima*, Sea Cineraria, or Ragwort; 2. *C. amelloides*, Blue-flowered Cineraria, or Cape Aster; 3. *C. lanata*, Woolly Cineraria.

The first has many woody stems, two or three feet high, divided into many branches, which have a white downy bark. The leaves are very woolly, six or eight inches long, deeply sinuated, and jagged on their borders. The stems which support the flowers are a foot or more in length, having two or three small leaves on each, shaped like those below, and terminated by many yellow flowers growing in panicles, or rather corymbs, shaped like those of common Ragwort; appearing from June to August. It is a native of the Mediterranean.

There is a variety with higher and more woody stems, broader leaves, and smaller flowers; but it is not so hardy.

The second species has the stem of a purplish colour, rough, dividing into many branches near the root, so as to form a low bushy plant, seldom rising more than two feet high; but the branches extending more than a foot on every side: the leaves about an inch long, and a third part of an inch broad, thick, succulent, rough, sessile, generally two, but sometimes three at a joint, or even four, two being larger and two smaller. Towards the upper part of the branches arise the peduncles, from four to six inches long, naked, each supporting one flower, the ray of which is of a fine sky blue, and, after it has been some time expanded, turns back towards the calyx. Martyn says, "it is never without flowers the whole year!"

The third is a plant of moderate growth, but

which, Martyn observes, 1. in the beauty of its blossoms far eclipses all the others cultivated in gardens: its petals, exteriorly, are of a most vivid purple, interiorly white. It flowers early in the spring, and, by proper management, may be made to flower the whole year through. It is a native of the Canary Islands.

Culture.—The plants in these different species are all capable of being increased either by seeds or cuttings, but the latter is the more ready method. The seeds should be sown in the early spring season in pots of light earth, plunged into a very gentle hot-bed; and when the plants are of sufficient growth, they should be removed singly into other pots, a little water being given.

The cuttings may be planted in pots of the same sort of earth during the summer season, or in the borders in warm shaded situations; when they have stricken good roots they may be removed into pots, in order to be protected in the winter months. When treated too tenderly, these plants are apt to become weak.

These plants afford variety when set out in assemblage with other sorts in pots, or the two first may be planted out in warm sheltered situations in the open ground during the summer; but they must be protected from frosts in the winter season in some way or other.

The third is valuable for the green-house, as being hardy, flowering readily, and easily propagated by cuttings.

CISTUS, a genus affording plants of the shrubby evergreen kind. Rock Rose.

It belongs to the class and order *Polyandria Monogynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-leaved permanent perianthium: leaflets roundish, concave; of which two alternate ones are lower and smaller: the corolla has five petals, roundish, flat, spreading, very large: the stamens consist of numerous capillary filaments, shorter than the corolla: anthers roundish, small: the pistillum is a roundish germ: style simple, the length of the stamens: stigma flat, orbiculate: the pericarpium is a roundish capsule, covered with the calyx: the seeds numerous, roundish, and small.

The species are: 1. *C. populifolius*, Poplar-leaved Cistus, or Rock Rose; 2. *C. laurifolius*, Bay-leaved Gum Cistus; 3. *C. ladaniferus*, Spanish Gum Cistus; 4. *C. incanus*, Hoary Rock Rose, or Rose Cistus; 5. *C. halimifolius*, Sea Purslain-leaved Cistus; 6. *C. Monspeliensis*, Montpellier Gum Cistus; 7. *C. Creticus*, Cretan Ladaniferous Cistus; 8. *C. albidus*, White-leaved Cistus; 9. *C. crispus*, Curled-leaved Cistus; 10. *C. salvifolius*, Sage-leaved Cistus.

In this numerous genus there are other species that may equally deserve cultivation.

The first has a stiff, slender, woody stem, six or seven feet high, sending out many branches the whole length: these and the leaves are hairy; the calyxes also very hairy: but the branches and leaves, when further advanced, become naked: the leaves are large, of a light green colour, sessile, with many nerves: the flowers are produced at the ends of the branches, on naked peduncles: the corolla is white, and soon drops off; and the petals, according to Linnæus, are tinged with purple on their edges; the stamens yellow; and the calyxes, before they unfold, three-cornered in their appearance. It is a native of Portugal, flowering in June and July.

The second species rises with a strong woody stem, to the height of five or six feet, sending out many erect hairy branches: the leaves are lanceolate, acute, thick, dark green above, and white beneath, very glutinous in warm weather; but, according to Linnæus, wrinkled, green on both sides, and scarce visibly hairy; the petioles becoming purple at the base: the flowers are produced at the ends of the branches upon long naked peduncles, branching on their sides into smaller ones, each sustaining one large white flower with a hairy calyx. It flowers in June and July, and is a native of Spain.

The third grows to the height of five or six feet, with a strong woody stem, sending out many hairy branches: the leaves are smooth on their upper side, but veined on their under, on short foot-stalks which join at their base, where they form a sort of sheath to the branch: the corolla is white, the size of the official Poppy: the germ has ten swellings: stigma sessile, without any style. It is a native of Spain, &c. It flowers from June till August.

Mr. Curtis objects to the propriety of the name *ladaniferus*, as it is not the plant from which *ladanum* is produced, though in a warmer climate it affords a gum of a similar kind.

There are varieties with large white flowers, and a purple spot in the middle of the petal, and with entire white flowers.

The fourth species has a shrubby stem, branching to a large bushy head, three or four feet high: the branches villose: the leaves are not at all nerved, ending in a point, a little flexuose in the disk, ending at the base in coalescent sheathing petioles, or rather obovate-spatulate; the lower more connate, and in a manner sheathing: the calyxes hairy, with subcordate leaflets: the petals purple, emarginate or orbiculate, quite entire and concave. It is a native of Spain.

The fifth species is an upright shrub, three or

four feet high: the branches are round, ash-coloured, angular at top, the younger ones dotted with yellow: the leaves are petioled, opposite, lanceolate, very white, scarcely soft, without veins, obtuse, flat, about an inch in length: the peduncle terminating, compound, white; supporting three or four bright yellow flowers, which appear in June and July. It is a native of Portugal.

There are varieties with numerous leaves and sulphur-coloured flowers, and with yellow flowers with purple spots in their bases.

The sixth rises with a slender stem, from three to four feet high, sending out many hairy branches from the bottom upwards: the leaves are very dark green, in warm weather covered with a glutinous sweet-scented substance: the peduncles, which come out at the ends of the branches, are long, naked, and sustain many white flowers, rising above each other; their calyxes are bordered, and end in sharp points. It flowers from June to August, and is a native of Narbonne.

There is a variety with olive-shaped leaves and sulphur-coloured flowers.

The seventh species is branching, diffused, a foot and half high and more: the stem and branches round, and somewhat villose: the leaves from broad stem-clasping, petioled, first spatulate, then ovate or lanceolate, somewhat acute, wrinkled, sometimes waved, roughish, thickish, quite entire, viscid, closely set on both sides and round the edge with white hairs of different lengths, some simple, others branched or headed, scarcely visible to the naked eye: peduncles one-flowered, terminating the last leafy twigs, erect and villose: the flowers of a rose purple-colour: these appear in June and July, and the seeds ripen in September. It is a native of the Levant.

This is the species from which the drug called *ladanum* is procured.

The eighth has a shrubby stem, branching from bottom five or six feet in height: much resembling the fourth, but differing in the branches being tomentose, not hairy: the leaves paler, soft, horizontal, sessile, by no means either petioled or sheathing, broad-lanceolate, mostly three-nerved: the flowers long from the branches, of a bright purple colour: it is a native of Narbonne, &c.

In the ninth, the branches are weak, slender, woody, spreading horizontally: it is seldom more than two or three feet in height: the peduncles and calyxes are covered with a thin wool: the flowers are of a purple or white colour, appearing in June and the following month. It is a native of Portugal.

The tenth has a slender, smooth stem, ce-

vered with a brown bark, never rising more than three feet high, and sending out many weak branches, spreading horizontally. The leaves are obtuse, without veins, not so soft as in many other species: the peduncles lateral, solitary, one-flowered, longer than the leaves: the corolla is white, and somewhat smaller than that of the other rock-roses. It flowers from June to August, and is a native of Italy, &c.

Culture.—All these sorts are capable of being either raised by seeds or cuttings in common earth, or on hot-beds; but the seed method produces the best plants. The seeds should be sown in the early spring, in a warm border near half an inch deep, and the plants will come up in six weeks; or, to render them more forward, in pots, and plunged in a moderate hot-bed. When the plants are of some growth, they should have the full air in mild weather, and frequent waterings, as well as occasional shade from the sun, while young; and when an inch or two high, some may be planted out separately in small pots, others in rich borders, occasional shade and water being given during summer. In autumn the potted plants should be removed to a frame, to have shelter from frost. Those in the full ground should also be shielded in frosty weather with mats. In spring, those remaining in the seed-bed should be planted out, and those in pots shifted into larger ones; to be continued another winter, and in the spring following be planted where they are to remain.

In the latter method, cuttings, five or six inches long, should be planted in beds of rich earth, occasional shade and water being given. When well rooted, they should be removed into separate pots: but by being planted in pots in spring, and plunged in a hot-bed, they are rendered much forwarder. In other respects they require the same management as the seedlings.

These are beautiful evergreen shrubs, effecting a fine variety at all seasons, both from their leaves being of different figures, sizes, and shades of green and white, and their being very profuse in most elegant flowers, which though of short duration, there is a daily succession of new ones for a month or six weeks on the same plant; and when these different species are employed, they exhibit a constant bloom for near three months.

They are mostly hardy enough to prosper in the open ground in any dry soil; and if they have a sheltered situation it will be an advantage, as in open exposures they are rather subject to injury from very severe frost; for which reason a plant or two of each sort should be potted, to have shelter in winter in the green-house.

The second and fifth are the most tender sorts.

In shrubby borders and clumps they should be placed towards the fronts, in assemblage with other choice shrubs of similar growth. All the sorts should be suffered to assume their own natural growth; the straggling branches being only cut in with a knife.

CITHAREXYLON, a genus which furnishes a shrub of the ornamental evergreen kind, for the stove. Fiddle Wood.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-form, five-toothed, acute, permanent: the corolla is one-petalled, funnel-wheel-form; tube twice as long as the perianth, thicker at the top: border five-parted, two-lipped; segments above villose, oblong, truncate, flat, very spreading: the stamina have four filaments, with the rudiment of a fifth from the middle of the tube, filiform, two of them somewhat longer: anthers oblong, twin, erect: the pistillum is a roundish germ: style filiform, the length of the stamens: stigma obtuse-headed: the pericarpium is a roundish berry, somewhat compressed, one-celled: the seeds two, ovate, two-celled, convex on one side, concave on the other, emarginate at the end.

The species cultivated is *C. quadrangulare*, Square-stalked Fiddle Wood.

It rises, in its native situation, to the size of a tree; but in this climate, only to that of a shrub. The head is handsome and branching: the branches are garnished by three oval spear-shaped leaves at every joint, standing in a triangle, upon short foot-stalks, about four inches long, and one or two broad, of a lively green colour, pretty much notched on their edges, having several deep veins running from the midrib to the edges; they are of a white colour on their upper side, and very prominent on their under. The flowers come out from the sides, and also at the ends of the branches, in loose bunches, which are succeeded by small pulpy berries, which are red when ripe. It is a native of the West Indies.

Culture.—The plants of this sort are capable of being increased both by seeds and cuttings of the young branches, but the latter is the method mostly employed.

The seeds should be sown in small pots, filled with rich earth, early in the spring, when they can be procured from abroad, plunging them into a tan hot-bed. When the plants are of sufficient growth, they should be carefully taken up and removed into other pots, separately re-plunging them in the hot-bed, shading them till they have formed fresh roots. They should after-

wards have plenty of air admitted, and be frequently watered in warm weather. They require to be kept in the bark stove the first winter; but afterwards they will bear being exposed in the open air, in a warm situation, a little in the summer, and in the dry stove in winter.

The cuttings may be planted in small pots of the same sort of earth during the early summer months, plunging them in a tan hot-bed. They afterwards require the same management as the seedling plants.

These plants afford variety in the stove in the winter season, by their fine evergreen leaves.

CITRUS, a genus comprehending plants of the Citron, Lemon, and Orange Tree kind.

It belongs to the class and order *Polyadelphia Icosandria*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved, five-cleft perianthium, flat at the base, very small, withering: the corolla has five petals, oblong, flat, spreading: the stamina have usually twenty filaments, subulate, compressed, erect, placed in a ring or cylinder, united generally into fewer or more bunches: anthers oblong: the pistillum is a superior, roundish germ: style cylindric, the length of the stamens: stigma globular, nine-celled within: the pericarpium is a berry with a fleshy rind, the pulp bladdery, nine-celled: the seeds in couples, sub-ovate, callous.

The species usually cultivated are: 1. *C. Medica*, Citron Tree; 2. *C. aurantium*, Orange Tree; 3. *C. decumana*, Shaddock Orange.

The first, in its wild state, is a tree that grows to the height of about eight feet, erect and prickly, with long reclining branches. The leaves are ovate-oblong, alternate, subserrate, smooth, pale green: the flowers white, odoriferous, on many-flowered, terminating peduncles: the fruit a berry, half a foot in length, ovate, with a protuberance at the tip, nine-celled or thereabouts; the pulp white, commonly acid; the rind yellow, thick, hardish, odoriferous, irregular. The fruit is esculent both in the raw and preserved state. It is a native of all the warmer parts of Asia.

Martyn says there are several varieties of the Citron which are procured from Genoa, which is the great nursery of this, as well as Lemons and Oranges; the cultivators of them there being as fond of introducing a new variety into their collections as nurserymen are here of obtaining a new Pear, Apple, or Peach.

The Citron Tree with sweet fruit, with sour fruit. The common Lemon and the Lime.

The first of the two latter varieties, or the Lemon Tree, differs, according to Martyn, from the

Orange, both in the naked footstalks of the leaves, and in the shape and colour of the fruit; but there is scarce any distinction between it and the Citron.

The most remarkable sub-varieties cultivated in this climate are, according to the same author: the Sweet Lemon, plain and variegated, the Pear-shaped, the Imperial, the Lemon called Adam's Apple, the Furrowed, the Childing, and the Lemon with double flowers.

The second, Sour Lemon or Lime, grows in its native climate to the height of about eight feet, with a crooked trunk, and many diffused branches, which have prickles on them: the leaves ovate-lanceolate, almost quite entire: the petioles usually linear: the flowers few together, on terminating peduncles: corolla oblong, white, with a purplish spot. It is a native of Asia, but common in the West Indies.

There is another sub-variety, the Sweet Lime, which the same writer says is generally a more upright tree, and bears a fruit which in size and form seems to hold a mean between the Lime and the Lemon.

These two last sub-varieties are however but little cultivated here.

The second species is a middle-sized evergreen tree, with a greenish-brown bark, dividing upwards into a branchy regular head: in its native country the branches are prickly: the leaves are broad-lanceolate, almost quite entire, smooth, with the petioles commonly winged: peduncles many-flowered, terminating: the corolla white: the stamens twenty, connected in several parcels: the berry, or fruit, sub-globular, flattened, of a golden colour, shining, odororous, three inches in diameter, divided within into about nine cells, filled with a bladdery pulp, having a sweet-acid juice in it: the rind is fleshy, of a middling thickness, covered with a pellicle which is somewhat biting and bitter to the taste. It is a native of India.

There are numerous varieties, but those most known in garden culture are: the Seville, the China, the Willow-leaved or Turkey, the Yellow and White Striped-leaved, the Curled-leaved, the Horned, the Double-flowering, the Hermaphrodite, and the Dwarf or Nutmeg Orange.

The first affords a large, rough-rinded, sour fruit, of excellent quality for culinary uses. It is a handsome grower, and the hardiest of the Orange tribe, as it shoots freely here, producing large and beautiful leaves, and flowers stronger and more abundantly, and generally bears a greater quantity of fruit than any other sort, and arrives to greater perfection.

The second has moderate-sized leaves, and a

smooth, thin-rinded, sweet fruit, of which there are several sub-varieties in warm countries, where they grow in the open ground.

The Willow-leaved Orange Tree, with narrow spear-shaped leaves, and Striped Willow-leaved Orange.

The Horned Orange is a common-sized tree, producing oblongish fruit, which divide at the end, the rind running out into divisions like horns.

The Hermaphrodite Orange is a common-sized tree, producing fruit partly like an Orange, and partly Citron-shaped.

The Dwarf or Nutmeg Orange has a low stem, and small bushy head, growing two or three feet high, with small oval leaves in clusters, and numerous flowers in bunches, covering the branches, succeeded by very small fruit. This, when in flower, is proper to be placed for ornament in rooms or other places, which it perfumes with its flowers; but it requires care, and is seldom in a perfect state of growth.

The Striped and Double-flowered varieties are most curious.

The third species, in its native situation, is a tree above the middle size, with spreading prickly branches. The leaves are ovate, sub-acute, seldom obtuse, very seldom emarginate, smooth, scattered: petioles cordate-winged, the wings as broad as the leaves: the flowers are white, very sweet scented, in copious upright terminating bunches: corolla reflex: stamens about twenty, nearly equal to the petals, collected into a many-cleft tube: the berry or fruit spheroidal, frequently retuse at each end, eight inches in diameter, of an even surface, greenish yellow, divided into twelve or more cells, containing some a red, others a white pulp, the juice in some sweet, in others acid. It is a native of India, introduced into the West Indies by Captain Shaddock.

Martyn says that there are many varieties of it, "one of which, superior to the rest in the flavour and smell of the fruit, has a smaller trunk, and sub-globular fruit, five inches in diameter, yellow on the outside, white, and very sweet within."

Culture.—The method principally practised in this climate for raising all these sorts of trees, is that of budding them upon stocks raised from the seeds; but they are likewise sometimes increased by the operation of inarching. New varieties are constantly raised from the seed.

Raising new Varieties and Stocks. Some seed should be provided from the most perfectly ripened fruits of the different sorts that are wanted early in the spring, at which time it should be sown in pots filled with good light earth, being covered to the depth of about half an inch,

plunging them in a tan hot-bed, giving them slight sprinklings of water and a free admission of air. When the plants have attained a tolerably strong growth, which is mostly in about eight or ten weeks, they should be gradually hardened to bear the full air, in which they may be continued till the weather renders it necessary to remove them into the green-house.

Some, however, in order to get them forward more rapidly, prick them out singly, when about two inches in height, into other pots, and plunge them into a second tan hot-bed, watering and giving them fresh air occasionally, and gradually hardening them as in the preceding manner. In this way they become large plants the following year.

But when the first mode is practised the plants should, in the following spring, about the middle of March or the beginning of the following month, be shaken carefully out of the seed-pots, so as to preserve the roots as entire as possible, and planted separately in small pots, made about half full with a compost of mellow loamy earth, and afterwards filled up with the same sort, so as to support the plants well, shade and water being occasionally given, till they become perfectly established. It is the custom with some, in order to have the plants more forward as well as more straight and upright, to plunge the pots, as soon as the plants have been placed in them, in a tan hot-bed, covered by frames and glasses, fresh air and water being duly supplied.

In these modes the plants are capable of furnishing good stocks for budding upon the second or third year. And where two hot-beds are made use of, many of them will be in a proper state for the purpose the second year. See **BUDDING.**

For the purpose of stocks, the Citron, Lemon, and Seville Orange, are said to be the best, as being the strongest shooters, especially the last.

When any of the plants appear particularly handsome and of healthy growth, they may be let remain, for the purpose of affording new varieties; but they are long in this way of raising them before they produce fruit; and when that happens, there is great uncertainty of their possessing any valuable qualities.

After the plants have been thus propagated, they only require the same management as other exotics of the green-house kind.

Method of budding them on the Stocks. The plants, when they have acquired twelve or fifteen inches growth, and are about the thickness of a large goose quill or rather more, are proper for the purpose. The buds should be procured

from sound, plump, young shoots of such trees as have a free growth, and are in a state of bearing. The operation should be performed about August, upon stocks of the same kinds and varieties, the buds being inserted from six to ten or more inches from the bottom, in proper parts of the stocks, and only one bud in each. See **BUDDING**.

After this has been done, the plants should be removed into the green-house, frame, or old tan hot-bed, in order to guard them from wet, and promote the inoculation of the vessels, and the healing of the parts; due shade and air being occasionally given; and when the union is perfectly accomplished, the ligatures removed, to permit the swelling of the plants without injury.

There is nothing more necessary than the application of proper supplies of moisture and air, with suitable protection from rain.

When the heads of the stocks have been removed in the early part of the following spring, the buds begin to shoot with vigour, especially where the aid of a tan hot-bed can be had recourse to. The plants should now be enured by degrees to the full air, for the latter part of the summer, and in the autumn and winter have the protection of a green-house.

Method of raising by Inarching, when this mode is employed, which is now but seldom, as the budding practice is much more convenient.

In this method, the young shoots of the trees raised in the above modes, which are nearly of the same size as the stocks, should be inarched with them in the early spring months, being so bent and connected with the trees, as to constitute a sort of arch. In the latter end of summer they are mostly in a state to be taken off from the parent tree. See **INARCHING**.

By this mode, the trees may be raised to a bearing state in a short time, as the young bearing branches may be made use of for the purpose, by which a new bearing tree is at once produced.

And different sorts may be connected, and produced on the same tree. But the trees furnished in this way are never so beautiful as those procured by that of budding.

Method of Culture in trained Trees. In order to have trees of this sort at once, it is the custom to purchase such as are brought from Italy, &c. in chests in the spring. They are of different sizes, and, when properly managed, produce as good trees in two years, as those raised in the above modes can in a great many.

In choosing these trees, those which shoot the most vigorously are mostly of the Citron or Shaddock kind; as the Orange rarely grows

with such luxuriance. The last, therefore, as being more valuable, should be attended to. And as some are only furnished with one bud, while others have two, the latter should be preferred, as they will produce the most regular-headed plants.

These trees, after having had their roots cleaned, trimmed, and well soaked in water for some time, as well as the stems and branches cleaned, should be planted separately in tubs or pots of suitable sizes, filled with earth of the same sort as mentioned above, watering them at the time, and plunging them in the tan-bed of the stove to the tops of the pots, &c. They should continue in this situation some time, and be well watered, both at the bottom and over the heads, shade being given when necessary, and a due proportion of air when they begin to shoot in the heads. These should likewise be cut occasionally, in order to induce them to throw out lateral branches, and form full handsome heads, air being now more freely admitted, to render the plants hardy, and capable of being preserved in the green-house during the following winter; being managed as other plants of the exotic green-house sort.

Method of Management in all the Sorts. As these trees require to be moved into different situations, it is mostly proper to have them in pots or large tubs; and where there are suitable glass frames for protecting them in winter, a few may be planted out against walls, which have flues that can be heated as there may be occasion. None of the sorts can be preserved in the open air only during a few of the summer months. The management in which cases is that of placing them in some warm public situation, at first washing their heads well, to remove dust or other substances, supplying them frequently with a little water when the season is hot, and preserving the moisture in the earth of the pots, by covering it with new cut short grass.

When they are removed to the green-house, on the approach of the autumn or winter, they should be deposited in a regular order; the largest to the back parts; proper supplies of air and water being given when the weather is suitable, and due protection provided against frost. It is occasionally necessary to water them over head, to remove all sorts of insects and other substances that may be upon their leaves, when all the decayed parts should be wholly removed.

Whenever the earth in the pots or tubs begins to bind or become stiff, it should be loosened to the depth of a few inches, and in the spring it is useful to remove a little of the surface, replacing it by such as is fresh.

It becomes necessary to shift the plants into larger pots or tubs of fresh earth, every second or third spring, about April, removing them with the balls of earth entire; the outside matted mouldy roots being pared off close, and part of the old earth at top, sides, and bottom, taken away: then the tubs or pots being cleaned out, or new larger ones provided, some crooked pieces of tiles should be laid over the holes at bottom, and some earth put in; placing the trees in the pots or tubs, and filling them up with more compost, pressing it down on the sides, giving a moderate watering at the tops, and retaining the plants in the green-house till the weather becomes sufficiently fine.

Such trees as have thin, straggling, or irregular heads should be pruned, so as to have the branches moderately short, and to form better heads.

But when they appear in an unhealthy state, with weak shoots, irregular heads, and small ill-coloured leaves, they should be pruned pretty close, and shifted into entire fresh earth; the roots being soaked and washed well in water. When they have been again planted, they should have a little water given immediately, and be plunged in a bark hot-bed, to remain until July, when they will have made strong shoots, and have formed new, full, and regular heads.

When the trees in pots have attained a large size, they should be shifted into tubs, hooped with iron hoops, having strong hooked iron handles at the tops, to receive poles to lift the trees by.

As there is often an abundance of flowers on these trees, when they appear in June and the following months, it may be proper to thin them a little, by taking off the smallest: and as the trees continue blowing and setting fruit for some time,—when a full crop is set, it is of benefit to the trees and fruit, to gather off the superabundant blossoms as they are formed.

In planting trees of this kind in the full ground, there must be frame erections for the support of glass or other coverings to defend the plants in inclement weather: in these situations the trees, from their having full scope for their roots, generally shoot strong, and produce large fruit, being trained within as wall or standard-trees.

The walls, for this purpose, should have a southern aspect, and be in a dry situation; and for the greater protection of the trees in severe frosts, there should be a fire-place, with a flue carried along a low wall in the front and ends; the trees being planted in the full borders against the back-walls, and their branches trained to them, five or six inches distance, air and

occasional water being given, as for those in the green-house, and the glasses put on in nights in bad weather, the flues only being made use of in sharp frosts, and then with very moderate fires, so as just to prevent their injurious effects.

Having managed them in this way during the autumn, winter, and spring seasons, they should about the beginning of June have the glasses removed, and the borders should be raised a little where the soil is wet, and be slightly dug over two or three times a year; necessary supplies of manure being given.

For standard trees, a more capacious and lofty glass covering should be erected against the wall, somewhat in the manner of hot-houses, only higher; a border being made the whole width and length, planting one or two rows of trees lengthways in it, suffering them to run up as standards, only giving a little pruning, just to preserve regularity.

Some have for this use lofty moveable glass-frames, so that two or three rows of trees can be planted in some conspicuous part of the pleasure-ground, the frames being taken wholly away in summer, so as to appear a little Orangegrove. And when the trees are well protected by the glasses, and other occasional coverings, &c. in winter, they grow in this way to a much greater height than those planted in tubs, or other methods.

The Citron trees should have warmer situations than the Orange during the winter, and be retained in the house later in the summer, at which period they should also have rather more water.

The common Lemon trees, as being more hardy than the Orange, of course require more air in the winter season.

CIVES. See ALLIUM.

CLARY. See SALVIA.

CLAYEY EARTH, that sort of earthy material that is chiefly composed of clay; which, from its stiff, adhesive and retentive nature, is very indifferently adapted to the growth of garden vegetables. See SOIL.

CLEMATIS, a genus comprehending plants of the herbaceous flowery perennial and shrubby kinds of hardy growth.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla has four petals, oblong, lax: the stamina consist of very many subulate filaments, shorter than the corolla: anthers growing to the side of the filaments: the pistillum has very many roundish, compressed germs, ending in subulate styles, longer than the sta-

mens; stigmas simple: there is no pericarpium: receptacle headed, small: the seeds very many, roundish, compressed, furnished with the style, in various forms.

The species chiefly cultivated are: 1. *C. Vitiella*, Purple Virgin's Bower; 2. *C. Vioora*, Leathery-flowered Virgin's Bower; 3. *C. Orientalis*, Oriental Virgin's Bower; 4. *C. Virginiana*, Virginian Virgin's Bower; 5. *C. crispa*, Cuffled-leaved Virgin's Bower; 6. *C. cirrhosa*, Evergreen Virgin's Bower; 7. *C. Flammula*, Sweet-scented Virgin's Bower; 8. *C. erecta*, Upright Virgin's Bower; 9. *C. integrifolia*, Entire-leaved Virgin's Bower.

The first has the stems very slender and weak, with many joints, whence come out side branches, which are again divided into smaller ones. If these be supported, they rise to the height of eight or ten feet: the leaves branch out into many divisions, each having a slender foot-stalk, with three oval entire leaflets: four foot-stalks generally arise from the same joint, two on each side; the two lower have three of these divisions, so that they are composed of nine leaflets; but the two upper have only two opposite leaves on each, and between these arise three slender peduncles, each supporting one flower. It grows naturally in the woods of Spain, &c. flowering in June and the following month. It has the title of Virgin's Bower, from its fitness for constituting such ornaments.

There are cultivated varieties with single blue, single purple, single red, and with double purple flowers.

The second species has many slender stems, sarmentose, round, striated, prostrate or climbing: the leaflets are three-lobed, divided to the petiole, smooth, paler underneath, entire, sometimes gashed, but commonly somewhat sinuated and waved, the nerve of the side-lobes not in the middle, but nearer to the inner side: peduncles long, solitary, axillary, with one pair of simple leaves in the middle: flowers solitary, nodding, coriaceous, ribbed on the outside, never opening, except at the end, where the petals are bent back; they are of a greenish purple on the outside, and very pale green within.

It is a native of Carolina, &c. flowering from June to September, ripening seeds in fine seasons.

The third has weak climbing stalks, rising to the height of seven or eight feet when they are supported: the leaves consist of nine leaflets, which are angular and sharp-pointed, glaucous on both sides, with such soft slender hairs on them as are not easily either seen or felt: the flowers drooping, and of a yellowish green colour, with a tinge of russet on the upper part

or outside. It flowers from July to October, and is a native of the Levant.

The fourth species has climbing stems, very high: the leaves are ternate: leaflets thinly but deeply serrate-angular, naked, cordate, veined: floral leaves simple, six together or subverticillate, quite entire, three-lobed or undivided: the flowers are of a white colour, and spreading. It is a native of North America, &c. flowering from June to August.

The fifth has weak stalks, which rise near four feet high, and by their clasps fasten themselves to neighbouring plants: the flowers come out singly from the sides of the branches upon short peduncles, having one or two pair of leaves on them, which are oblong and sharp-pointed: the corolla is purple, the inside is curled, and has many longitudinal furrows. It is a native of Carolina, &c. flowering in July, and ripening seed in September.

The sixth species has a climbing stalk, rising to the height of eight or ten feet, sending out branches from every joint, whereby it becomes a very thick bushy plant: the leaves are sometimes single, sometimes double, frequently ternate, serrate; keeping their verdure all the year: the tendrils come out opposite to the leaves: the flowers are produced from the side of the branches; are large, and of an herbaceous colour, appearing at the end of December, or beginning of January. It grows naturally in Spain.

The seventh is rather creeping than climbing. It is lower and more tender than some of the other species: the leaves are also smaller, with five and seven pinnae, or three-lobed, or three-leaved; the leaflets ovate-lanceolate, with few gashes, and one or two teeth: the flowers are of a white colour, sweet-scented, and appear from July to October. It is a native of the South of France, &c.

The eighth species has a perennial root: the stems are herbaceous, annual, round, scarcely branched, from three to five feet high, firm, ending in a panicle at top: the leaves are opposite, and pinnate; the leaflets from two to four pairs, with an odd one at the end, petioled, lanceolate or ovate, acute, the upper surface smooth and green, the lower somewhat villose and glaucous; they are entire, seldom two-lobed: the flowers are of a white colour at the ends of the stalks; come out in June, and ripen seeds in winter. It is a native of France, &c.

There is a variety, with only two or three pairs of leaflets, which are narrower, and stand further asunder, having shorter stalks and larger flowers.

The ninth has a perennial root: the stems are

several, annual, a foot and half high or more, striated, erect, a little fistulose, somewhat pubescent at top, terminated by a nodding flower of a blue colour, and sometimes branched in the upper axils. The leaves are opposite, ovate, sessile, quite entire, nerved, veined, acute, smooth, except about the edge and on the dorsal nerves, which are slightly villous. It is a native of Germany, &c. flowering in July.

Culture.—The Purple Virgin's Bower, and its different varieties, as well as the six following sorts, are capable of being increased by layers, and some of them even by cuttings of the young shoots.

In the first method the layers should be made from the shoots of the preceeding or the same year, and be laid down in the summer before they become woody, as in this way they succeed with greater certainty. The branches should have their tops left a few inches out of the earth, a little water being given at the time. When they are become well rooted, as in the following autumn or spring, they may be taken off, and planted out where they are to remain, or in the nursery.

The evergreen sort may however be laid down at any season, but the above is the best. It is also capable of being raised from cuttings of the young shoots planted out in either the spring or summer months in pots of good earth, plunging them in a very moderate hot-bed. The suckers from the roots may likewise be taken off and planted out in the same manner as the layers, when they will often produce good plants.

The two last sorts are capable of being readily increased by parting the roots, and planting them out either in the autumn or the early spring months. In this way every part which has fibres preserved at the bottom, and a bud in the upper end, will readily take root and become a plant.

These sorts, as well as some of the others, may also be propagated by sowing the seeds either where the plants are to remain, or in a spot of good mould in the early autumn or spring season, in the latter case removing the plants into their proper situations when of sufficient growth. In this mode the plants are, however, longer in arriving at the flowering state. The roots may be divided every two or three years, according to the number of divisions that are made. Where the soil is dry, the plants should be new planted in the autumn; but in the contrary circumstances, in the spring, in order to make them flower strong.

All these plants are of hardy growth, and capable of succeeding in almost any sort of soil. The climbing sorts require proper support, to

prevent their trailing upon the ground, and are well adapted for ornamenting naked walls, arbours, or other similar places, as well as for running upon trees or shrubs in particular situations.

The two last sorts are well suited for ornament in the clumps and borders of pleasure-grounds, to be set out singly.

CLEOME, a genus affording plants of the herbaceous annual exotic kind for the stove.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Putamineae*.

The characters are: that the calyx is a four-leaved perianthium, very small, spreading; the lower leaflet gaping more than the rest; deciduous: the corolla four-petalled: all the petals ascending, spreading; the nearest intermediate ones smaller than the others: nectareous glands three, roundish, one at each division, except one at the calyx: the stamina consist of six filaments, (sometimes twelve or twenty-four,) subulate, declining: anthers lateral, ascending: the pistillum is a simple style: germ oblong, declining, the length of the stamens: stigmas thickish, rising: the pericarpium a long silique, cylindric, placed on the style, one-celled, two-valved: the seeds are very many, and roundish.

The species mostly cultivated are: 1. *C. triphylla*, Three-leaved Cleome; 2. *C. pentaphylla*, Five-leaved Cleome; 3. *C. heptaphylla*, Seven-leaved Cleome.

The first is an annual plant which rises two feet high, sending out many side branches, with leaves, having one large spear-shaped lobe in the middle, and two very small ones on the side; these sit close to the branches: the flowers come out singly from the sides of the branches, upon long peduncles, and are large and flesh-coloured. Procured from Jamaica.

The second species is an annual, elegant but fetid plant, upright, either wholly smooth or with a few hairs at bottom; the stem round and branching: the leaves on the stem and branches all quinate; the leaflets obovate, acute, very finely serrate: floral leaves ternate, obovate, obtuse, quite entire; the lowest on short petioles, the rest sessile: the racemes of flowers very long, formed by solitary, spreading, one-flowered peduncles issuing from some of the axils, of a white or flesh-colour. It is a native of both the East and West Indies.

The third has an herbaceous stem, from three to five feet high, branched, upright, angular-grooved: the branches sub-divided, spreading, grooved, hirsute, viscid and prickly: the leaves are alternate, scattered, spreading, digitate: leaflets lanceolate, acuminate, nerved, patulous, pubescent: the flowers white or flesh-coloured,

terminating in long loose spikes. It is a native of Jamaica, flowering in June and the following month.

There are other species in this genus that may be cultivated.

Culture.—These plants, which are of the annual sort, are raised by seeds, which should be sown in pots of light earth in the early spring, being plunged in a moderate hot-bed; and when the plants are of a few inches growth they should be removed into separate pots, and re-plunged in the hot-bed. When they have attained sufficient growth, they should either be removed to the stove or be placed in the green-house, or even in the open air, during the hot summer months while they are in flower; in any of which they produce a good effect.

CLETHRA, a genus containing a plant of the hardy deciduous flowering shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved, five-parted perianthium: leaflets ovate, concave, erect, permanent: the corolla has five petals, oblong, broader on the outside, from erect spreading, a little longer than the calyx; the upper one broadest: the stamina consist of ten subulate filaments, the length of the corolla: anthers oblong-erect, gaping at the top: the pistillum a roundish germ: style filiform, erect, permanent, increasing: stigma trifid: the pericarpium is a roundish capsule, involved in the calyx, three-celled, three-valved: the seeds are very many, angular.

The only species is *C. alnifolia*, Alder-leaved Clethra.

In this the roots spread far on every side, and send up many stems, from eight or ten to fourteen feet high, which are covered with a grayish bark, and divide into small round alternate branches. The leaves are about three inches long, and an inch and quarter broad in the middle; they are of a deep green on their upper side, and of a whitish green underneath, alternate, and on very short petioles. The flowers are on loose spikes from four or five inches to a span long; the petals are white. They appear in July, and, when the season is mild, some spikes are produced in October. It is a native of North America.

Culture.—This is propagated either by seeds, layers, or suckers.

In the first mode the seeds, procured from America, should be sown in pots of light earth, and removed into the shade during summer, and

shelter in winter, as sometimes the plants do not come up till the second spring after they have been sown.

The layers should be made from the young shoots in autumn, and water given them the following summer; and in the autumn after, or when well rooted, they should be taken off and planted out in separate pots, or in places where they are to remain.

The suckers from the roots may be removed in the autumn or early spring months, fibres being preserved to them as much as possible, being planted out in pots or other places where they are to remain.

It is a very ornamental shrub, particularly during the time of its bloom, but should have a rather moist soil.

CLIFFORTIA, a genus furnishing plants of the evergreen exotic shrubby kind for the green-house.

It belongs to the class and order *Dioecia Polyandria*, and ranks in the natural order of *Tri-coccae*.

The characters are: that in the male the calyx is a three-leaved perianthium: leaflets ovate, acute, coriaceous, spreading, deciduous: there is no corolla: the stamina have about thirty capillary erect filaments, the length of the calyx: anthers twin, oblong, obtuse, erect, compressed. In the female the calyx is a three-leaved perianthium, equal, erect, superior, permanent: leaflets acute, lanceolate: there is no corolla: the pistillum is an oblong, inferior germ: styles two, filiform, long, plumose: the stigmas are simple: the pericarpium is an oblong capsule, nearly columnar, two-celled, crowned with the calyx: the seeds solitary, nearly columnar, linear.

The species principally cultivated are: 1. *C. ilicifolia*, Ilex-leaved Cliffortia; 2. *C. trifoliata*, Three-leaved Cliffortia.

The first is a shrub with alternate declining branches, clothed with truncated membranes and stipules. The leaves are alternate, sheathing very shortly at the base, roundish, having seven or nine teeth terminated with spines, spreading, recurved at the end, flat, cartilaginous about the edge, nerved, smooth, biennial, horizontally deciduous, leaving a reddish permanent sheath. The flowers are lateral, axillary, sessile, solitary, of a greenish yellow colour.

The second species has slender, woody, procumbent stems, silky with hairs, sending out slender branches on every side. The leaves are sessile, hairy, the middle leaflet much broader than the two side ones, which are lanceolate:

The flowers are axillary, on very short peduncles, of a yellowish green colour, coming out in July and August. Male plants mostly cultivated.

Culture.—The propagation in these plants may be effected either by cuttings or layers of the young shoots. The first should be planted in pots of good light mould either in the spring or summer months, plunging them in moderate hot-beds.

The layers should be laid down in the spring, and, when perfectly rooted, taken off and set out in pots as in the other way.

Their further management is that of keeping them in the protection of the green-house, watering them freely in summer, but very sparingly during the winter season.

All these plants are very ornamental in their flowers, especially the male ones, producing a fine effect in the green-house collections.

CLIMBING PLANTS, such plants as ascend either spirally round supports, or by means of clasplers and tendrils.

They are either herbaceous or woody; and which, according to their mode of climbing, may be denominated Twining Climbers, Cirrhus Climbers, and Parasitic Climbers.

The first are such as have winding stalks, and twist about any neighbouring support, such as scarlet kidney-beans, hops, and some sorts of honeysuckle.

The second are such as ascend by means of spiral strings, issuing from the sides of the stalks and branches, or from the foot-stalks of the leaves, and even from the leaves themselves, twisting about any thing they meet with, by which their stalks are supported and arrive at the proper height, such as most of the pea tribe, cucumber, vine, passion-flower, and various others.

The last are also of the same kind, but their clasplers plant themselves as roots in the bark of the plants on which they ascend, or in the crevices of walls or pales, thereby supporting themselves, and mount to their tops, as the ivy, Virginia creeper, radican bignonia, and several others.

Some of these sorts of plants, both of the herbaceous and shrubby kinds, are very ornamental. The principal of the herbaceous kind are; the everlasting pea, painted lady-pea, scarlet and white kidney-bean, nasturtium, gourd, hop-plaat, scarlet convolvulus, and many others.

The chief of the shrubby kinds, or such as have perennial stalks are: the radican and evergreen *bignonia*, climbing *celastrus*, different

species and varieties of virgin's-bower, kidney-bean-tree of Carolina, ivy, Virginia creeper, many sorts of honeysuckle, passion-flower, many varieties of periwinkle, the vine, and several others.

Most of the herbaceous climbers are very ornamental, and may be introduced in large borders, placing sticks for their support. The more tall growing sorts may also be employed to run over arbours or rural seats in pleasure-grounds.

The shrubby sorts are most of them proper furniture for shrubberies of considerable extent, in which they may be employed in different ways; some being dispersed in the clumps, detached from other plants, placing tall, strong stakes for their support; others placed in large borders and the boundaries of lawns, &c.; and some near hardy trees and large shrubs, to climb about their stems, or interweave in their branches and tops; in the ornamenting of naked or unsightly walls and other high buildings; and in decorating and forming rural arbours, where there is any kind of open-work for the branches to climb upon, they are likewise very useful, as they shoot very rapidly.

These sorts should many of them be kept properly cut in during the autumn and early spring months.

CLITORIA, a genus containing plants of the exotic climbing kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceae* or *Leguminosae*.

The characters are: that the calyx is a one-leaved, erect, tubular, five-toothed, permanent perianthium: the corolla is papilionaceous: standard very large, straight, emarginate, waved at the margin, spreading, and overshadowing the other petals: wings oblong, straight, obtuse, shorter than the standard: keel shorter than the wings, falcated somewhat roundly: the stamina are in two brotherhoods (simple and nine-cleft): anthers simple: the pistillum is an oblong germ: style ascending: stigma obtuse: the pericarpium is a legume very long, linear, compressed, one-celled, two-valved, with the tip subulate: the seeds many and reniform.

The species are: 1. *C. ternata*, Winged-leaved Clitoria; 2. *C. Brasiliana*, Brazilian Clitoria; 3. *C. Virginiana*, Small-flowered Virginian Clitoria.

The first rises with a twining herbaceous stalk to the height of four or five feet, in the manner of the kidney-bean, requiring similar support: the leaves are winged, composed of two or three

pairs of leaflets, terminated by an odd one, of a beautiful green colour, and placed alternate on the stalks: from the appendages of the leaves come out the peduncles; each encompassed by two very fine leaves about the middle, where they are bent, sustaining a very large, gaping, beautiful blue flower, the bottom part of which seems as if growing to the top. It is a native of the East Indies.

There are varieties with white flowers and with blue double flowers.

The second species has likewise a twining stem, which rises five or six feet high, having at each joint one ternate leaf on a long petiole. The flowers come out singly from the axils on long peduncles, encompassed about the middle with two small oval leaves: the flowers are very large, the standard being much broader than that of the first sort, and the two wings are larger: the flowers are of a fine blue colour, appearing in July, and in warm seasons ripening seeds in autumn. It is a native of Brasil.

The third species has an herbaceous twining stalk, with ternate, oblong-pointed leaves, with three or four whitish purple flowers on short footstalks. It is a native of Virginia.

Culture.—These plants are increased by sowing the seeds in pots of light earth, plunging them into a bark hot-bed, a little water being given at the time. When the plants are of some growth they should be removed into other pots separately, due shade being given till fresh rooted, and a proper supply of fresh air, to prevent their drawing up weak. When they are become large they should be removed into the bark-bed of the stove, and be properly supported with sticks for them to twine upon.

They afford much ornament by their beautiful flowers.

CLOVE. See CARYOPHYLLUS.

CLOVE-PINK. See DIANTHUS.

CLUSIA, a genus comprising plants of the exotic tree kind for the stove. Balsam Tree.

It belongs to the class and order *Polygamia Monoecia*, and ranks in the natural order of *Guttiferae*.

The characters are: that the calyx is a four-, five-, or six-leaved perianthium, imbricate: leaflets concave, permanent, the interior ones gradually smaller: the corolla has four, five, or six roundish petals, spreading, concave, large: the stamens consist of many simple filaments, shorter than the corolla: the anthers are simple, growing to the side of the tip: the pistillum is an ovate-oblong germ: style none: stigma starred, flat, obtuse, permanent: the pericar-

pium is an ovate capsule, marked with furrows, celled, the valves bursting in a radiate manner: the seeds are numerous, ovate, covered with pulp, affixed to a columnar angulated receptacle.

The species are, 1. *C. flava*, Yellow-flowered Balsam Tree; 2. *C. venosa*, Vein-leaved Balsam Tree.

The first in its native situation grows to the height of twenty feet, and shoots out many branches on every side, with thick, round, succulent leaves, placed opposite. The flowers are produced at the ends of the branches, each having a thick succulent cover: these are of different colours in different plants, some being red, others yellow, some white, and some green. After the flowers are past, they are succeeded by oval fruit, which are also of different colours in different plants. It is found in Jamaica.

There are varieties with white flowers and scarlet fruit, with pink-coloured flowers and greenish fruit, and with yellow fruit.

The second in its native state rises to the height of twenty or more feet, has very large oval spear-shaped leaves, ending in points, placed alternate on the branches, having several ribs, which go off from the midrib alternate, rising upward to the side of the leaves, and a great number of small veins running horizontally between these ribs. The borders of the leaves are serrate, and their under sides of a shining brown colour. The branches are covered with a woolly down, and the flowers produced in loose spikes at the end of the shoots; these are smaller than those of the first, and of a rose colour. Found at Campeachy.

Culture.—These plants are increased by planting the cuttings of the young shoots in pots of light mould, being plunged in the hot-bed of the stove. When the plants have stricken full roots, they may be removed into other pots separately; but it is the best practice to plant them in separate pots at first.

They should be kept constantly in the stove in the bark-bed, and be only very sparingly watered, but in other respects they require the same management as other stove exotics.

CLUYTIA, a genus comprehending plants of the shrubby succulent evergreen exotic kind, for the stove and green-house.

It belongs to the class and order *Dioecia Gynandria*, and ranks in the natural order of *Tricoccæ*.

The characters are: that in the male the calyx is a five-leaved perianthium, size of the corolla: leaflets ovate, obtuse, concave, spreading: the

corolla has five petals, spreading very much, cordate: claws flat, shorter than the calyx: nectaries exterior five, three-parted, oblong, spreading, length of the claws of the petals, placed in a circle within the petals: nectaries interior five, glandiform, small, melliferous at the tip: the stamina have five filaments placed on the middle of the style, remote from the corolla, spreading horizontally: anthers roundish, versatile: pistillum has no germ: style cylindric, truncate, very long, bearing the stamens on its middle. In the female the calyx has the perianth as in the male, permanent: the corolla has also the petals as in the male, permanent: nectaries exterior five, twin, roundish, of the same size and situation as in the male: nectaries interior none: the pistillum is a roundish germ: styles three, bifid, reflex, length of the corolla: stigmas obtuse: the pericarpium is a globular capsule, six-furrowed, rough, three-celled: the seeds are solitary, roundish, even, appendiculated at the tip.

The species cultivated are: 1. *C. alternoides*, Narrow-leaved Cluytia; 2. *C. pulchella*, Broad-leaved Cluytia; 3. *C. Eluteria*, Maritime Cluytia.

The first has a shrubby stem, six or eight feet high, putting out many side branches, which grow erect: the leaves are of a grayish colour, and entire: the flowers come out from the joints, at the setting on of the leaves, towards the upper part of the branches; they are small, and of a greenish white, appearing from June to August.

The second species rises about the same height with the first, but has a stronger stem: the leaves are much larger, sea-green, and on petioles an inch long: the flowers are like those of the first sort in shape and colour, but those on the male plants are smaller, and grow closer together than those of the female, but both are sustained upon short footstalks. These flowers appear at the same time as those of the first sort, and the seeds ripen in autumn.

The third, according to Miller, rises with an upright shrubby stalk, not more than three or four feet high in this climate; but in places where it grows naturally, to upwards of twenty, with the branches forming a large spreading head: the leaves are shaped like those of the black poplar, and the flowers in spikes at the ends of the branches. It is a native of both the Indies.

Culture.—These plants are capable of being increased by planting cuttings of the young branches in pots of light fresh earth, either in the spring or summer months, giving them a

little water at the time, and plunging them in the bark-bed. When they have formed good roots they should be carefully removed into separate pots.

The two first sorts afford variety in the greenhouse, and the last in the stove; but they are all capable of being exposed in the open air during the summer months.

They are very ornamental in their evergreen leaves.

CNEORUM, a genus furnishing a plant of the low evergreen shrubby kind. Widow-wail.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Tricocca*.

The characters are: that the calyx is a very small, three-toothed, permanent perianthium: the corolla has three petals, oblong, lanceolate-linear, concave, erect, equal, deciduous: the stamina have three subulate filaments, shorter than the corolla: anthers small: the pistillum is an obtuse, triangular germ: style erect, firm, length of the stamens: stigma trifid, spreading: the pericarpium is a dry, globose berry, three-lobed, three-celled (three-berried drupe): the seed solitary, round (conducuplicate, in a two-celled shell).

The only species is *C. tricoccum*, Widow-wail, or Spurge-Olive.

It is a humble shrub, which seldom rises more than two feet and a half high in this climate, but spreads out on every side with many lateral branches, so as to form a thick bush: the stems are ligneous, and almost as hard as those of the box-tree, and the wood of a pale yellow colour under the bark: the branches being garnished with thick stiff leaves, of an oblong oval shape, about an inch and a half long, and a quarter of an inch broad, of a dark green colour, having a strong vein or rib through the middle: the flowers are produced single, from the wings of the leaves, toward the extremity of the branches, are of a pale yellow colour, beginning to appear in May, being succeeded by others during the summer months, and, when the autumn proves favourable, continue in flower till the end of October. It is a native of the South of France, &c.

Culture.—These plants may be raised either from seeds or cuttings.

In the first mode the seed should be sown in the early autumn, on a spot of light common earth, to the depth of about a quarter of an inch. The plants mostly appear in the following spring, when they should be kept clear from weeds; and in the second spring the strongest be thinned

out and planted in the places where they are to grow, or in nursery-beds, to stand two or more years, when they will be proper for the shrubbery or other places.

The cuttings should be made from the preceding year's shoots, and planted in pots of good earth, plunging them in a mild hot-bed. When well rooted, they may be removed into other separate pots, or be planted in the borders where there is a proper degree of shade, a very little water being given at the time.

Slippings of the same sort of shoots also succeed, and produce good plants when set in the same manner in the later summer months.

The plants are hardy ornamental evergreens for the fronts or borders of clumps in pleasure-grounds.

They are likewise sometimes introduced into the greenhouse for the purpose of variety. They succeed best in a rather dry soil.

COCCOLOBA, a genus containing plants of the evergreen tree and shrubby exotic kinds.

It belongs to the class and order *Octandria Trigynia*, and ranks in the natural order of *Horaceæ*.

The characters are: that the calyx is a one-leaved, five-parted perianth; divisions oblong, obtuse, concave, spreading most widely, coloured, permanent: there is no corolla: the stamina have eight filaments, subulate, patulous, shorter than the calyx: anthers roundish, twin: the pistillum is an ovate germ, trigonal: styles three, short, filiform, spreading: stigmas simple: there is no pericarpium: calyx bearded, thickened, converging, involving the seed; the seed is an ovate nut, acute, one-celled.

The species cultivated are: 1. *C. uvifera*, Round-leaved Sea-side Grape, or Mangrove Grape-tree; 2. *C. pubescens*, Great-leaved Sea-side Grape; 3. *C. punctata*, Spear-leaved Sea-side Grape; 4. *C. tenuifolia*, Small Sea-side Grape.

The first, in its native situation, is a lofty spreading branched irregular inelegantly formed tree, but rendered handsome by its leaves and fruits: the bark is cinereous and thin, in the younger trees smooth, in older ones full of chinks: the timber, hard, ponderous, and red: the leaves quite entire, ending in a short blunt point, coriaceous, thick, large, alternate, deep green, with the midrib and veins connected with it more or less scarlet, on short petioles sheathing at the base: the flowers small, whitish, smelling like those of the cherry. The berries are of the size of grapes. It is common in the sugar colonies.

The second species is an upright tree, sixty or

eighty feet high in its native situation: the head has frequently no more than two or three thick branches, but little-divided and irregular: the bole is sometimes forty feet in length, and puts forth a branch or two about the middle: the timber is of a deep red, heavy, very hard, and also incorruptible, but brittle; when used for posts, the part under ground becomes hard as stone: the leaves are roundish, cordate, quite entire, very much veined and wrinkled, frequently extremely hirsute, sometimes however almost smooth, alternate, few, two feet in diameter, on a short petiole sheathing at the base. It is common in Martinico.

The third is a small upright branched tree, fifteen feet high: the leaves quite entire, subcoriaceous, veined, shining, alternate, half a foot long, commonly two or three on each flowering branchlet, on petioles sheathing at the base: the flowers are white. It is a native of Carthage.

The fourth species is of humbler growth than any of the former; the flowers and fruit being smaller than those of the other sorts; and it recedes from them in having membranaceous, not coriaceous leaves: the flowers are small, and disposed in simple axillary spikes. It is a native of Jamaica.

Culture.—These different species may be easily propagated by sowing the seeds obtained from the places where they grow naturally, in pots filled with light rich earth, in the early spring season, plunging them in a bark hot-bed; and when the plants are of sufficient growth, they should be removed into small pots, and replaced in the hot-bed, water and due shade being given them till they have stricken fresh root. Their management afterwards is the same as that of other more tender plants.

As these plants only attain a shrubby growth in this climate, and are tender, they should be constantly retained in the stove or hot-house.

They afford a good variety by the fine ever green appearance of their large leaves.

COCHLEARIA, a genus affording a plant of the herbaceous tap-rooted esculent kind.

It belongs to the class and order *Tetradynamia Siliculosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate, concave, gasping, deciduous: the corolla is four-petalled, cruciform: petals obovate, spreading, twice the size of the calyx: claws narrow, shorter than the calyx, patulous: the stamina have six subulate filaments, length of the calyx: the opposite ones shorter: anthers obtuse, compressed: the pistillum is a heart-shaped germ: style simple,

very short, permanent: stigma obtuse: the pericarpium is a heart-shaped silicle, gibbous, turgid, emarginate, furnished with a style, two-celled, scabrous; valves gibbous, obtuse: the seeds about four in each cell.

The species cultivated is *C. Armoracia*, Horse Radish.

It has a creeping perennial root: the leaves are very large, varying much, sometimes deeply pinnatifid, sometimes entire, and only crenated: the flowering-stem is a foot or eighteen inches high, branching at top, almost naked: the flowers are white, in loose panicles, coming out in May.

Culture.—The culture in this plant is readily effected by planting such cuttings of the roots as contain buds or eyes. Those made from the tops, and which have the heads or crowns of the plants to them, are the best. The offsets and side shoots may likewise be employed for the purpose, as is mostly the case with market-gardeners. They should be about an inch or two in length. As these plants require to be put into the ground to a great depth, in order that they may form long fine roots, the earth should either be dug over before the cuttings are placed in, or trenched to the depth of fifteen or twenty inches at the time, according to the method of planting that is made use of.

The soils most adapted to the growth of these plants are those of the more light deep kinds; but they will succeed tolerably on almost any. Where the land has been trenched over in the above manner, the usual mode of planting is by means of the dibble; but there is another practice which is sometimes followed, which is that of trenching in the sets, or placing them in the earth at the time it is dug over.

In the first method, after the ground has been prepared, a line is stretched across, beginning at the end, and holes made to the depth of fifteen or twenty inches along it, by means of a long sharp dibble, at the distance of nine inches from each other, a set or cutting being dropped into each hole, and the mould closed upon it. The line should then be moved forward to the distance of twenty inches or two feet, and another row put in in the same manner, proceeding in the same way till the whole is completed.

In the latter the ground should be light and loose, beginning at one end of the piece, and opening a trench two spades wide, and one spade deep, digging the bottom: then a row of cuttings should be set along the middle of the bottom nine inches distant, inserting them to their tops in the earth; then digging the next trench the same width and depth, turning the earth into the first upon the row of plants, breaking

all large clods, and levelling the top. After this, proceed to the second trench, planting it in the same way, performing the whole of the work in a similar manner.

The proper season for this work is in the autumn for the dryer sorts of land, and February or beginning of the following month for such as are moist.

In these methods of planting the ground may be sown the first year with spinach, radishes, or any slight-rooting crop, that comes off early in the summer, to allow of their being kept clean afterwards by hoeing; which is all the culture they require.

Sometimes the plants make such progress as to have roots large enough for use in the course of a few months; but if not much wanted, they are better to remain a twelvemonth or more.

In taking up the roots for use, the best method is to open a trench two spades wide, close on the side of the first row of plants, and as deep as the stool or bottom of the roots, without disturbing them; then with a large knife or sharp spade to cut off all the shoots, large and small, of each stool, close and level, from whence they rise, leaving the parent stools in the earth, and after having taken up all the plants of the first trench, proceeding to the next row in the same manner, turning the earth into the first, and cutting off all the shoots as before, taking up the whole in the same way as wanted. The remaining undisturbed stools continue to send up a fresh supply of shoots in succession for many years; but after the two first years the stools begin to spread at bottom, and send up many small shoots between and in the rows; all which intervening small spawn should be annually drawn up in the beginning of summer, to render the principal shoots large and fine. And though the stools of these roots endure many years, in time they become weak or worn out, as well as the soil; consequently in six or seven years, when the shoots become weak and small, a fresh plantation should be made in some other place.

These roots are much used for culinary purposes when scraped fine.

COCOS, a genus comprising a plant of the exotic tree kind for the stove. The Cocoa-nut Tree.

It belongs to the class and order *Monoecia Hexandria*, and ranks in the natural order of *Palmæ*.

The characters are: that the male flowers are in the same spadix with the females: the calyx is an universal, univalve spathe: spadix branching: the perianth three-parted, very small; divisions subtriquetrous, concave, and coloured: the

corolla consists of three ovate, acute, patulous petals: the stamina consist of six filaments, simple, length of the corolla: anthers sagittate: the pistillum a scarcely manifest germ: styles three, short: stigma obsolete: the pericarpium abortient: the female flowers on the same spadix with the males: the calyx is a common spathe with the hermaphrodites, as likewise the spadix: the perianth three-parted: divisions roundish, concave, converging, coloured, and permanent: the corolla consists of three petals, permanent, like the calyx, but rather larger: the pistillum is an ovate germ, no style: the stigma three-lobed: the pericarpium a coriaceous drupe, very large, roundish, obscurely triangular: the seed is a very large nut, subovate, acuminate, one-celled, valveless, obtusely three-cornered, the base perforated by three holes: the kernel is hollow.

The species are: 1. *C. nucifera*, Cocoa-nut Tree. 2. *C. aculeata*, Great Macaw Tree.

In the first the roots are very slender, simple, and flexile; arising separately from the bottom of the trunk, and spreading in all directions; some running to a great depth, while others creep almost parallel to the surface. The trees grow to a great height; their stems being composed of strong fibres like net-work, which lie in several laminas over each other, out of which come the branches, or other leaves, which grow twelve or fourteen feet long. The first leaves which push out from the nut when planted are different from those which are afterwards produced; as they are broad, and have many folds in each: whereas the after leaves have a strong midrib, twelve or fourteen feet long, on which the leaflets are placed alternately: these are from six to eight or nine inches long, and are almost triangular, having very sharp points, and very stiff. The flowers come out round the top of the trunk of the tree in large clusters; are inclosed in a large spathe or sheath, and the nuts afterwards formed in large clusters, ten or twelve together. As soon as all the parts of the flowers have gained a due degree of perfection, the spathe splits on the under side, from the bottom upwards, and exposes the common bunch, with all its flowers, to the open air: most of which are males, and fall off gradually as the spathe withers, leaving the embryo fruit generally fixed to the lower and stronger part of the stalk, to increase and ripen by degrees. It is a native of the East Indies.

The second species is a large tree in its native situation, which rises to thirty feet in height, has an ash-coloured bark, and is very thick set with sharp black prickles, of different lengths, placed usually in rings. The fruit is as large as

a crab, and of the same shape: under a green skin it has a thin sweetish astringent pulp; and within that a nut full of a white sweet eatable kernel. It is common in the Caribbee islands.

Culture.—The plants in both these sorts are raised from the nuts, which are brought hither from their native places: these are planted separately in pots of rich earth, depositing them on their edges, and plunging the pots over their rims in a bark hot-bed. They soon germinate at the holes in the bases, and appear; when frequent waterings should be given and the plants continued in the stove, shifting them occasionally into larger pots, being careful to preserve the balls of earth about their roots, and not to break the fibres of the roots in performing the business.

COFFEA, a genus affording a plant of the flowering shrubby evergreen kind for the stove. The Coffee Tree.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Stellatae*.

The characters are: that the calyx is a five-toothed perianth, very small, superior: the corolla is one-petalled, salver-shaped; tube cylindric, slender, many times longer than the calyx: border flat, five-parted, longer than the tube: divisions lance-shaped: sides rolled back: the stamina consist of five subulate filaments, placed on the tube of the corolla: anthers linear, incumbent, length of the filaments: the pistillum is a roundish, inferior germ: style simple, length of the corolla: stigmas two, reflected, subulate, thickish: the pericarpium is a roundish berry, umbilicated by a one- or two-celled puncture: the seeds one or two, solitary, elliptically-hemispherical, gibbous on one side, flat on the other, where it is furrowed longitudinally; involved in an aril.

The species cultivated is *C. Arabica*, Eastern Coffee Tree.

It seldom rises more than sixteen or eighteen feet high in its native situation, or more than ten or twelve in this climate. The main stem grows upright, and is covered with a light brown bark. The branches are horizontal, and opposite; the lower ones longest, the others gradually decreasing to the top, so as to form a pyramid: the leaves are opposite, when fully grown four or five inches long, and an inch and a half broad in the middle, ovate-lanceolate, the borders waved, and the surface of a lucid green: the flowers are produced in clusters (two to four) at the base of the leaves, sitting close to the branches; they are of a pure white, with a very grateful odour, but of short duration; being

succeeded by berries, which are first green, then red, and, when fully grown, change to black, and become ripe.

Culture.—These plants are raised from the berry, sown as soon as possible after become ripe, in pots of light rich earth, half an inch deep, plunging them in the bark-bed, and giving light sprinklings of water once a week. The plants soon appear, which, when about three inches high, should be pricked out into separate small pots, giving a little water, and replunging them in the bark-bed, shade from the sun being given, till they have taken root, and repeating the waterings moderately, as there may be occasion, with a due admission of air.

It is also capable of being propagated by layers and cuttings, which, though they emit roots rather reluctantly, deserve the trial; planting them in pots of good earth, plunging them in the bark-bed, and supplying them duly with water and occasional shade.

These plants should afterwards remain continually in the stove, having water given two or three times a week in summer, and once or twice a week in winter, and fresh air admitted in common with other exotics of the hot-house; and as they advance in growth, be placed in larger pots in proportion, shifting them into fresh earth every year or two, trimming off all dry matted roots on the outside of the balls, as also part of the old earth; then placing the plants in the pots again, filling them up with fresh compost, such as good light kitchen garden earth, giving them water, and immediately plunging the pots in the bark-bed.

As cleanliness is essential in the culture of this shrub in the stove; when it has contracted much dust or filth, all the branches and leaves should be well washed, by sprinkling water over them.

And as it is frequently attacked by insects, particular attention is necessary, when these appear, to wash and clean every branch and leaf separately, repeating it as often as necessary; but when very numerous, it is a sign of ill health and weakness in the plant, and proceeds chiefly from the root; in which case, it is advisable to shift the plants into entire fresh earth, and replunge them into the bark-bed.

This is a very ornamental plant for the hot-house, especially in autumn and winter, when in fruit.

COLCHICUM, a genus comprehending plants of the perennial flowering bulbous-rooted kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that there is no calyx (except scattered spathes): the corolla six-parted: tube angulated, rooted; divisions of the border lance-ovate, concave, erect: the stamina consist of six subulate filaments, shorter than the corolla: anthers oblong, four-valved, incumbent: the pistillum is a buried germ within the root: styles three, thread-form, length of the stamens: stigmas reflex, channelled: the pericarpium is a three-lobed capsule connected internally by a suture, obtuse, three-celled, sutures gaping inwardly: the seeds many, nearly globular, and wrinkled.

The species cultivated are: 1. *C. autumnale*, Common Meadow Saffron; 2. *C. montanum*, Mountain Meadow Saffron; 3. *C. variegatum*, Variegated Meadow Saffron.

The first has a bulbous root, about the size and shape of the tulip, but not so sharp-pointed at the top; the skin or cover is also of a darker colour: these bulbs are renewed every year; for those which produce the flowers decay, and new roots are formed above: the flowers come out in autumn; these arise with long slender tubes from the root, about four inches high, shaped like those of the saffron, but larger: the number of flowers is generally in proportion to the size of the roots, from two to seven or eight: in March the green leaves appear, these are commonly four to a full-grown root; they are folded over each other below, but spread open above ground, standing cross-ways: they are of a deep green, and when fully grown are five or six inches long, and one and a half broad. The seed-vessel comes out from between the leaves in April, and the seeds ripen in May, after which the leaves soon decay. It is a native of most parts of Europe.

There are varieties, with white flowers; with striped flowers; with broad leaves; with striped leaves; with many flowers; with double purplish flowers; with double white flowers; with many white flowers. The double sorts are chiefly cultivated in the garden.

The second species has a smaller root, with a darker coat: the leaves come up soon after the flowers decay, and continue green all winter; long, narrow, and spread on the ground, decaying in June: the flowers are of a reddish purple colour, and appear from August to September. It is a native of Spain, &c.

In the third the leaves are smaller than those of the common sort, for the most part three in number, and of a paler and fresher green colour, lying close upon the ground, broad at the bottom, a little pointed at the end, waved about the edges: the root is not so large as that of the common sort: the flowers are smaller, but

very beautiful, whitish, with deep blue or purple spots. It is rather tender, and blows about October or November. It is a native of the Greek islands.

Culture.—These plants are increased by dividing the bunches of their roots at the time their leaves decay, in the latter part of the summer; as from the latter end of June till the middle of the following month, planting the separated bulbs or off-sets to the depth of about three inches.

They are sometimes planted in beds, in rows at eight or ten inches asunder; but they may be dispersed in the fronts of borders and clumps with success.

It is of advantage to take up and divide the bunches of root-bulbs every two or three years. See **BULBOUS ROOTS**.

New varieties may be raised from seed sown in boxes, or large pots, in autumn, covering it a quarter of an inch deep, and placing them in a warm situation till spring, when the plants will appear, which should have only the morning sun during summer, giving water in dry weather; and in the second summer, when their leaves decay, planting them out to flower, either in beds, or other methods.

They are of a hardy nature, and produce a fine effect, by their curious growth, as well as flowers, in the autumn and winter seasons.

COLUTEA, a genus containing plants of the hardy deciduous flowering shrubby kind. Bladder Senna.

It belongs to the class and order *Diadelphica Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-shaped, five-cleft, erect, nearly equal, permanent: the corolla is papilionaceous; standard, wings, and keel differ in figure and various proportion; wings pressed close together, lanceolate: the stamina have diadelphous filaments, (single and nine-cleft) ascending: anthers simple: the pistillum is an oblong germ, compressed, attenuated to each end: style ascending: stigma is a bearded line extended from the middle of the style to its tip, from the upper part: the pericarpium is a legume very large, very broad, inflated, transparent and membranaceous, the upper suture erect, the lower gibbous, one-celled, gaping on the upper suture at the base: seeds several, kidney-shaped.

The species cultivated are: 1. *C. arborescens*, Common Bladder Senna; 2. *C. cruenta*, Oriental Bladder Senna; 3. *C. Pocockii*, Pocock's Bladder Senna; 4. *C. frutescens*, Scarlet Bladder Senna.

The first has several woody stems, which grow to the height of twelve or fourteen feet,

sending out many woody branches, with winged leaves, composed of four or five pairs of oval lobes, placed opposite, terminated by an odd one; these are indented at the top in form of a heart, and are of a grayish colour. The flowers come out from the wings of the leaves upon slender peduncles about two inches long, each sustaining two or three yellow flowers, whose standard is reflexed and large, with a dark-coloured mark on it. Native of the South of France, &c.

The second species has a woody stem, which sends out many branches on every side, which do not rise above seven or eight feet high; these are not so strong as those of the first sort, and the leaves are composed of five or six pairs of small heart-shaped leaflets, terminated by an odd one. The flowers proceed from the side of the branches, standing upon peduncles, each sustaining two or three flowers, shaped like those of the first sort, but smaller; they are of a dark red colour, marked with yellow, appearing in June, the seeds ripening in autumn. It was found in the Levant.

The third is a shrub which seldom grows more than six or seven feet high in this country. The branches are very slender, and much more pliant than those of the common sort, and therefore it grows less erect. The leaves are composed of nine pairs of leaflets, and are much smaller. The flowers are of a brighter yellow, appear a month earlier than in the common sort, and there is a succession of them till late in the autumn, which renders it much more valuable; and the branches not shooting so luxuriantly nor so upright, it is in less danger of being broken by strong winds in summer. It is a native of the Levant.

The fourth species is a hoary shrub, with tomentose leaflets, smooth on the upper surface. It rises from two to four feet in height in favourable seasons and in a warm situation; plants of three years standing will sometimes be six feet high. The stem is weak, the side branches grow erect, and the leaves have ten or twelve pairs of leaflets. The flowers are sustained on axillary peduncles, three or four together, and are of a fine scarlet colour, coming out in June. It is a native of the Cape.

Culture.—All these plants are capable of being increased by sowing the seed in the early spring months, as in February for the three first sorts, and the two following months for the fourth, upon beds of common earth, covering them in to the depth of about half an inch. When the plants have attained sufficient growth, as in the following spring for the former sorts, and when they are three or four inches high

in the latter, they should be removed, and the first sorts planted out in rows in the nursery, and the last in warm sheltered situations or in pots, to be protected during the winter.

This sort may likewise be rendered much forwarder, so as to flower the same year, by having recourse to a hot-bed.

The three first species are also capable of being raised by layers from the young shoots, made either in the autumn or spring seasons; but as the fourth sort does not continue long, and is more tender than the others, new plants should be raised from seed every two or three years.

They are all beautiful ornamental plants, especially the fourth, and may be introduced into the clumps, borders, and other parts of shrubberies and pleasure-grounds, where they produce a fine effect by their foliage and flowers. The last sort should, however, have a dry warm soil and sheltered sunny situation.

COMPOSITION FOR TREES, a substance discovered, prepared, and applied by Mr. Forsyth, for the purpose of removing diseases, defects, and injuries in fruit- and forest-trees. It is directed to be composed in the following manner:

"Take one bushel of fresh cow-dung, half a bushel of lime-rubbish of old buildings (that from the cieling of rooms is preferable), half a bushel of wood-ashes, and a sixteenth part of a bushel of pit or river sand: the three last articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, until the stuff is very smooth, like fine plaster used for the cieling of rooms.

The trees should be prepared for its application "by cutting away all the dead, decayed, and injured parts, down to the fresh, sound wood, leaving the surface of the wood very smooth, and rounding off the edges of the bark with a draw-knife, or other instrument, perfectly smooth, which must be particularly attended to; then lay on the plaster about one eighth of an inch thick, all over the part where the wood or bark has been so cut away, finishing off the edges as thin as possible: then take a quantity of dry powder of wood-ashes mixed with a sixth part of the same quantity of the ashes of burnt bones; put it into a tin box, with holes in the top, and shake the powder on the surface of the plaster, till the whole is covered over with it, letting it remain for half an hour to absorb the moisture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder till the whole plaster becomes a dry smooth surface.

"All trees cut down near the ground should have the surface made quite smooth, rounding it off in a small degree, as before mentioned; and the dry powder directed to be used afterwards should have an equal quantity of powder of alabaster mixed with it, in order the better to resist the dripping of trees and heavy rains.

Such portions of the composition as may be left for a future use "should be kept in a tub or other vessel, and urine of any kind poured on them, so as to cover the surface; otherwise the atmosphere will greatly hurt the efficacy of the application.

And "where lime-rubbish of old buildings cannot be easily got, take pounded chalk, or common lime, after having been slaked a month at least."

It is further remarked, that "as the growth of the tree will gradually affect the plaster, by raising up its edges next the bark, care should be taken; where that happens, to rub it over with the finger when occasion may require (which is best done when moistened by rain), that the plaster may be kept whole, to prevent the air and wet from penetrating into the wound."

But "as the best way of using the Composition is found, by experience, to be in a liquid state," Mr. Forsyth adds, that it should "be reduced to the consistence of pretty thick paint, by mixing it up with a sufficient quantity of urine and soapsuds, and laid on with a painter's brush. The powder of wood-ashes and burnt bones is to be applied as before directed, patting it down with the hand."

It is also advised, "when trees are become hollow, to scoop out all the rotten, loose, and dead parts of the trunk to the solid wood, leaving the surface smooth; then to cover the hollow, and every part where the canker has been cut out, or branches lopped off, with the Composition; and as the edges grow, to take care not to let the new wood come in contact with the dead, part of which it may be sometimes necessary to leave; but to cut out the old dead wood as the new advances, keeping a hollow between them, to allow the new wood room to extend itself, and thereby fill up the cavity, which it will do in time, so as to make as it were a new tree."

If the cavity be large, to cut away as much at one operation as will be sufficient for three years. But in this to "be guided by the size of the wound, and other circumstances. When the new wood, advancing from both sides of the wound, has almost met, to cut off the bark from both the edges, that the solid wood may join, which, if properly managed, it will do, leaving

only a slight seam in the bark. If the tree be very much decayed, not to cut away all the dead wood at once, which would weaken the tree too much, if a standard, and endanger its being blown down by the wind. It will consequently be necessary to leave part of the dead wood, at first, to strengthen the tree, and to cut it out by degrees as the new wood is formed. If there be any canker, or gum oozing, the infected parts must be pared off, or cut out with a proper instrument. When the stem is very much decayed and hollow, it will be necessary to open the ground and examine the roots." See DISEASES OF TREES.

Various interesting facts and observations on the advantage and utility of this Composition in the removal of the diseases of different sorts of trees, may be seen by consulting Mr. Forsyth's valuable "Treatise on the Culture and Management of Fruit-Trees."

COMPOST-GARDEN, such earthy or other substance as, when combined with manure, constitutes the means of improving the soil for the growth of plants.

As almost all sorts of plants and vegetables, though they succeed better in some kinds of soil than others, grow well in mould which is duly impregnated with vegetable materials, it is not necessary to have recourse to the composing of such substances as are tedious and troublesome in their preparation except for particular sorts of plants, whether of the esculent, flower, shrub or tree kinds.

For the purpose of improving the condition of garden grounds in general, the substances should be suited to their particular qualities and properties; as where they are of a light, loose, gravelly or sandy nature, the application of loamy and other sorts of heavy earthy matters in combination with well-rotted dung, will be beneficial; and such as are of the heavy, clayey or loamy kinds, be greatly ameliorated by the use of light sandy earth, scrapings of roads, sea-sand, ashes, the reduced bark employed in hot-beds, saw-dust, and other decayed ligneous materials, with a proper proportion of good rotten dung.

Most of the esculent sorts of plants succeed perfectly in good vegetable mould of moderate adhesion, such as is met with in gardens that have been some time under cultivation.

Some particular sorts of plants require such as is loose and light, as those of the moist bulbous-rooted tribe; others, such as is dry, sandy, or calcareous, as those of the more succulent kinds; and that of the rich loamy description is in common well adapted to the growth of most

sorts of trees and shrubby plants; and earthy compositions of the boggy kind are suited to the raising of some sorts of plants and flowers.

The composts most usually employed for the more tender curious plants, in pots, tubs, and hot-beds, are, for the less delicate kinds, such as are constituted of fresh maiden earth taken from old pasture-ground, of a light but rich mouldery quality, inclining to loam. In forming it, the top spit or turf should only be taken, to which should be added a third or fourth part of thoroughly rotten dung, the whole being laid in a long heap or ridge, three feet high, in a situation exposed to the sun and air, for several months, turning it over occasionally, that the mass may be converted to mould, and the materials be properly incorporated together. Where good pasture earth cannot be procured, a quantity of good garden-mould will answer, adding one third or fourth part of rotten dung, as that of old hot-beds; and, where the soil is of a rather stiff nature, also about a fourth part of sea-sand, drift, ashes, or rotten tan, the whole being thrown up in a heap for five or six months; but the longer the better, stirring it over several times.

For plants that require light, loose mould, composts may be formed of one-half good light pasture mould, or that of a garden, and about one-third of sand and rotten dung, forming the whole in a heap in the same way as the preceding.

Where a soft, loose, rich earth is required, Composts of good light rich earth of the garden or pasture, rotten tanner's-bark, or rotten earthy wood, saw-dust, tree-leaves, rotten dung, and a small portion of sand may be used, after being well blended together.

If dry rubbishy soils are wanted, Composts formed of one-half of perfectly light garden or pasture mould, and one-half of sea-sand or road-soil, and a little screened lime rubbish, the whole being laid in a heap for some months, and turned over two or three times, to be well mixed, may be had recourse to.

Where the heavier sorts of Composts are wanted, they may be prepared from fresh loamy earth from a common or any dry pasture-ground, where the soil is of a soft and moderately light friable nature, taking the uppermost spit, sward and all, chopping it to bits, and adding rotten dung, as above, which, after lying in a ridge or heap twelve or fifteen months, to rot the sward, and being frequently turned over to break the lumps, and mix the parts well together, may be made use of with success.

Where the culture of flowers is intended,

Composts for different curious sorts may be formed in the following manner:

For auriculas;—of light earth from pasture-ground, the top spit with the sward, and neat's dung, of each about an equal portion, and about half the quantity of drift or sea-sand, and, when it can be had, a little rotten willow earth, or any rotten earthy wood, or old rotten tan or saw-dust, forming the whole into a heap for several months, turning it over several times at intervals. This Compost is also proper for fine carnations, ranunculuses, and anemones: these flowers, however, often blow equally well in common, rich, light, garden earth.

For hyacinths;—composts formed of neat's dung and drift sand, of each an equal portion, and half the quantity of old rotten tan, are very useful. Where it can be easily procured, the same portion of rotten leaves of trees, or a little more rotten bark, and a proportionate quantity of light earth from a pasture or garden, may be used, the whole being mixed in a heap, to lie at least a year, giving it frequent turnings; but if it remains in the heap fifteen or eighteen months it will be the better. See the *Culture of different Plants*.

In Composts where sand is employed, sea or drift sand is to be preferred; and in Composts where rotten, ligneous, earthy substances are requisite, that of rotten willow-trees is the best; or old rotten tanner's bark may be substituted, as a proper ingredient.

Composts should constantly be formed in an open exposure, free to the influence of the sun, air, rains, frosts, &c. and the ingredients be made in a heap, rather extended in length, like a ridge, about a yard or four feet in thickness, being turned over frequently, and the bottom thrown to the top, that all the parts may be well mixed, and equally participate of the influence of the sun and other causes.

These composts, when used, should not be screened, except for some particular purposes, which are mentioned, being only broken fine with the spade and hands, as when fine-screened, or sifted, they become too compact for the roots of plants to spread and extend themselves in.

COMPTONIA, a genus which contains an ornamental plant of the tree kind.

It belongs to the class and order *Monoecia Triandria*.

The characters are: that in the male flowers the calyx is a cylindric ament, loosely imbricate all round with concave, kidney-form, acuminate, caducous, one-flowered scales: perianthium two-leaved: leaflets equal, boat-shaped, shorter than the scale of the ament: there is no corolla: the stamina consist of three filaments, shorter than

the calyx, forked: anthers six, two-valved. In the female flowers the calyx is an ovate ament, closely imbricate all round with one-flowered scales, as in the male: perianthium six-leaved: leaflets opposite in pairs, filiform, membranaceous at the base, many times longer than the scale of the ament: there is no corolla: the pistillum is a roundish germ: styles two, capillary: there is no pericarpium: the seed is an oval nut, one-celled, valveless.

The species cultivated is *C. asplenifolia*, Fern-leaved Comptonia.

It rises with slender shrubby stalks, near three feet high; they are hairy, and divide into several slender branches. The leaves are from three to four inches long, and half an inch broad, alternately indented (or sinuated) almost to the midrib; they are of a dark green, hairy on their under side, and sit close to the stalks. It is a native of North America, flowering here from March to May.

Culture.—This plant is propagated either by seeds or layers. In the former method the seeds should be sown about an inch deep in a bed of light earth in the spring season, and the plants will appear the following year, when they should be kept clear from weeds, and have occasional waterings in dry weather.

In the latter mode the young summer shoots should be laid in autumn in the slit method of laying, and when well rooted they may be taken off and planted out.

These plants are hardy, and capable of succeeding in almost any soil. They are introduced for variety in the shrubbery and other parts of ornamented grounds.

CONSERVATORY, a place constructed somewhat in the manner of the green-house, but more spacious and elevated, and finished in a neater and more perfect way, being designed for containing and preserving the more rare and curious sorts of plants, as well as for affording amusement by being provided with walks laid with some sort of neat material, according to the taste of the proprietor, in a serpentine or other irregular manner between the plants.

Houses of this nature should have dry and rather elevated situations, at a small distance from the residence, and be ranged in such a manner as to have the benefit of the sun as much as possible during the day. They must likewise be provided with flues, for the purpose of communicating fire heat when it may be necessary, and also valves and other contrivances for the introduction of fresh air when wanted, and to afford due ventilation.

The sides, ends, and roofs, must be formed

with glass, as in the greenhouse, in order to admit light freely, and at the same time protect the plants.

The ground plan and elevation of an elegant and very convenient house of this sort may be seen in the annexed plate.

CONVALLARIA, a genus containing plants of the hardy herbaceous perennial flowery kind. Lily of the Valley, and Solomon's Seal.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla is monopetalous, bell-shaped, smooth: border six-cleft, obtuse, open reflected: the stamina consist of six subulate filaments, inserted into the petal, shorter than the corolla: anthers oblong erect: the pistillum is a globose germ: style filiform, longer than the stamens: stigma obtuse, three-cornered: the pericarpium is a globose berry, three-celled, before maturity spotted: the seeds are solitary or in pairs, and roundish.

The species cultivated are: 1. *C. maialis*, Sweet-scented Lily of the Valley; 2. *C. polygynum*, Single-flowered Solomon's Seal; 3. *C. multiflora*, Many-flowered Solomon's Seal; 4. *C. verticillata*, Narrow-leaved Solomon's Seal; 5. *C. racemosa*, Cluster-flowered Solomon's Seal.

The first has a perennial root, with numerous round fibres transversely wrinkled, creeping horizontally just below the surface to a considerable distance. The whole plant is smooth. Four or five alternate, oblong, blunt, slightly nerved, purplish scales surround and bind together the base of the leaves and stalk. There are two leaves, petioled, elliptic or lanceolate, pointed at each end, from four to five inches long, and near an inch and half broad in the middle, quite entire, upright, smooth, nerved, one usually larger, of a bright green colour; petioles clasping, round, the outer dotted with red, and tubular, to receive the inner, which is solid. Scape lateral, the length of the leaves, upright, smooth, semicylindrical. The flowers from six to eight, in a raceme, nodding, white, and fragrant. It is a native of Europe; flowering in May. Hence it is termed May, and sometimes Convall Lily.

There are varieties with narrower leaves, with broader leaves, with double variegated flowers; with double reddish or red flowers; with double white flowers.

The second species has a twisted root, full of knots: on a transverse section of it characters appear that give it the resemblance of a seal, whence the name of Solomon's Seal. The stem is from a span to near a foot in height, of a

harder texture than the third species: the leaves are simple, inclined, angular, twisted, sometimes three-edged, four inches long and one broad, oval-lanceolate, half embracing the stem, glaucous underneath, frequently bending down on one side. The flowers sweet-scented; generally solitary, but sometimes two, on long axillary peduncles, much larger than in the third sort. The berries are black. It is a native of the north of Europe.

It varies with double flowers, &c.

The third has a round stem, from eighteen inches to two or three feet high, erect and unbranched: leaves usually bent upwards, and to one side, underneath glaucous, five inches long and two broad; the lower ones oval, the upper oval-lanceolate, half embracing the stem. The flowers are several together (from two or three to seven or eight), axillary, on branched compressed peduncles. The berries round, of a blackish blue colour, purple and red.

This is a larger plant than the second sort. It is a native of the North of Europe.

There are varieties with double flowers.

The fourth sort has a perennial root, toothed: the stem is simple, angular, striated, erect, eighteen inches high. The leaves narrower than the other sorts, lanceolate, entire, smooth, three or four in a whorl, three or four inches long, and from half an inch to an inch in breadth, bright green, and glaucous beneath. The peduncles are axillary, solitary, branched, pendulous, and from two to six-flowered. The flowers of a greenish white colour. The berries violet or deep red. It flowers in June; and is a native of the North of Europe, &c.

The fifth species has the stems two feet high, unbranched, with many oblong leaves embracing them at the base, resembling the leaves of Plantain. The flowers are small and white, and are produced in single spikes at the top, and are succeeded by small red berries, about the same size as in the first sort. It flowers the beginning of June, and is a native of Virginia, &c.

Culture.—In all these sorts of plants their culture may be effected by parting their roots, either in the autumn or spring months, but the former is the better season, planting them out where they are to remain. They afterwards only require to be kept free from weeds, and removed every three or four years, according as their roots may be increased.

As they succeed best in rather shady situations, they are well suited for affording variety and ornament in shady places, such as the borders or the sides of walks in woods and wilderness parts of pleasure-grounds, producing considerable variety by the singularity of their growth and the

beauty of their foliage and flowers. They also grow well in many other situations that are more open.

CONVOLVULUS, a genus containing several plants of the herbaceous trailing annual and perennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Campanaceæ*.

The characters are: that the calyx is a five-parted perianthium, converging, ovate, obtuse, very small, permanent: the corolla is one-petalled, bell-shaped, spreading, large, plaited, obscurely five-lobed: the stamina have five subulate filaments, shorter by half than the corolla: anthers ovate, compressed: the pistillum is a roundish superior germ: style filiform, length of the stamens: stigmas two, oblong, broadish: the pericarpium is a capsule enwrapped by the calyx, roundish, two-celled, one-two- or three-valved (commonly three-celled, seldom two- or four-celled: partition alternate with the valves): the seeds are in pairs, roundish (one or two seeds in each cell, sometimes abortive, few with a twisted embryo).

The species mostly cultivated are: 1. *C. purpurea*, Purple Convolvulus, or Convolvulus Major; 2. *C. tricolor*, Three-coloured Trailing Convolvulus, or Convolvulus Minor; 3. *C. Nil*, Anil, Blue or Azure Convolvulus; 4. *C. Canariensis*, Canary Evergreen Convolvulus; 5. *C. cneorum*, Silver-leaved Convolvulus; 6. *C. Batatas*, Tuberous-rooted Convolvulus, or Spanish Potatoes.

The first is an annual plant, that rises on support to the height of ten or twelve feet. In its native situation it sends out long branches, which twist about the trees, and rise to a great height. The leaves are smooth, heart-shaped, ending in long points; the ears at the base are large and rounded, and the petioles long and slender. The peduncles are long, each sustaining three purple-coloured flowers. It flowers from the end of June till destroyed by the frost. It is a native of America.

It is usually known in garden-culture by the name of *Convolvulus Major*.

There are varieties, with deep purple flowers, with white flowers, with red flowers, and with whitish blue flowers.

The second species is an annual plant, with several thick herbaceous stalks, about two feet long, not twining, but bending towards the ground, upon which many of the lower branches lie prostrate. The leaves are likewise sessile. The peduncles come out just above the leaves at the same joint, and on the same side; they are about two inches long, each sustaining one large open bell-shaped flower, of a fine blue colour, with a white bottom, varying to pure white, and

sometimes beautifully variegated with both colours. The white flowers are succeeded by white seeds; but in the blue ones they are dark-coloured. It is a native of Barbary, &c. commonly known in garden-culture under the title of *Convolvulus Minor*.

The third is also an annual plant, rising with a twining stalk eight or ten feet high. The leaves are woolly, ending in sharp points and on long petioles. Each peduncle sustains two flowers of a very deep blue colour, whence its name of *Anil* or *Nil*.

It is a beautiful plant; and it flowers all the latter part of the summer. It is a native of America.

The fourth species has strong fibrous roots. The stems are woody, branched, growing twenty feet high, and more when supported. The flowers are axillary, several on one peduncle, for the most part of a pale blue colour, but sometimes white. It flowers in June, July, and August, and sometimes ripens seeds here. It is a native of the Canary Islands.

The fifth has upright, shrubby stems, about three feet high. The leaves are lanceolate, blunt, silky, placed closely on every side the stem; they are near two inches long, and a quarter of an inch broad. The flowers are produced in clusters at the top of the stem, sitting very close; they are of a pale rose-colour, and come out in June and July, but do not perfect seeds in this climate.

The sixth species has a round perennial stem, hispid, prostrate, creeping, putting forth scattered, oblong, acuminate tubers, purple or pale-coloured on the outside. The leaves are angular, on long petioles. The flowers are purple, lateral, large, three or thereabouts together, on upright peduncles. It is a native of both Indies, &c.

Culture.—All the annual kinds are easily raised, by sowing the seed in the early spring months in patches, in the places where they are to flower, four or five seeds in each, half an inch deep. When the plants are an inch or two high, they should be thinned out, so as to leave but two or three of the best in each patch, managing them afterwards as other plants of similar growth.

The perennial species, which are tender, are mostly increased by layers from the young shoots in the spring, which take root freely in three or four months: cuttings of the young shoots also grow freely in a shady border, when planted during the summer months. Suckers taken from the root also make good plants when planted in the same way. They should be kept in pots of rich earth, and managed in the same way as geraniums, myrtles, and other similar plants.

The Tricolor or Minor *Convolvulus* may either be suffered to trail upon the ground, according to its natural growth, or tied up to sticks: but the other annual species and varieties, being of the twining or running kind, should have tall sticks to climb upon, on which they will rise several feet in height, flowering all the way, and appearing highly ornamental.

The perennial sorts are elegant plants for the greenhouse collection, and deserve the attention of those who can preserve them during the winter season.

The last species may be raised by planting the roots, either whole or divided, in a warm border, in the early spring months, where they will send up stalks, and flower in the autumn; but to have them in greater perfection, they should be planted in a slender hot-bed, covered with a frame and glasses during bad weather, by which means they flower earlier, and often form many tubers at the joints. They are chiefly planted for the sake of variety.

CONYZA, a genus containing a plant of the shrubby sort for the greenhouse.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoidææ*.

The characters are: that the calyx is common, imbricate, roundish, squarrose: scales acute, the outer somewhat spreading: the corolla compound tubulose: corollæ hermaphrodite numerous, tubular in the disk: females apetalous, roundish in the circuit: proper, of the hermaphrodite funnel form: border five-cleft, patulous: of the females, funnel-form: border three-cleft: the stamina in the hermaphrodites, filaments five, capillary, very short: anther cylindric, tubular: pistillum in the hermaphrodites, an oblong germ: style filiform, length of the stamens: stigma two-cleft: in the females, germ oblong: style filiform, length of the hermaphrodite, more slender: stigmas two, very slender: there is no pericarpium, calyx converging: the seeds to the hermaphrodites solitary, oblong; down simple: to the females, solitary, oblong; down simple: the receptacle flat.

The species mostly cultivated is *C. candida*, White-leaved or Woolly Flea-bane.

There are other species that may be cultivated when variety is wanted.

It has the stem suffruticose, six inches high, upright, round, hairy, whitish, and branched: the leaves are very white, quite entire, alternate; the flowers purple, peduncled, heaped. According to Miller, the peduncles are woolly, nine inches high, one-, two-, or three-flowered; the flowers of a dirty yellow. It has a pleasant smell. It is a native of Candia.

Culture.—It may be increased by planting slips or cuttings in separate pots of good earth, the former in the spring, and the latter in the summer months, plunging them first in a hot-bed, and giving water pretty freely till they have stricken root in both methods.

These plants must have the protection of a good garden frame or greenhouse during the winter.

They afford an agreeable variety from the silvery appearance of their leaves.

COPAIFERA, a genus containing a plant of the exotic balsamiferous kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Leguminosæ*.

The characters are: that there is no calyx: the corolla has four petals, oblong, acute, concave, very spreading: the stamina consist of ten filiform filaments, incurved, a little longer than the corolla: anthers oblong, incumbent: the pistillum is a round, compressed-flat, pedicelled germ: style filiform, incurvate, length of the stamens: stigma obtuse: the pericarpium is an ovate, bivalve legume, pointed with part of the style: the seed single, ovate, involved by a berried aril.

The species is *C. officinalis*, Balsam of Capevi Tree.

In its native situation it is a lofty elegant tree, with a handsome head: the extreme branches at the axils are flexuose, and have a smoothish bark of a brownish ash colour. The leaves are alternate, pinnate, the midrib or rachis round, and four inches long: leaflets three or four pairs, without an odd one, lanceolate-ovate, ending in a blunt point, quite entire, shining, subcoriaceous, with several obliquely-ascending veins, the middle nerve prominent beneath, and ferruginous; they are from two to three inches long, and on short petioles; the inner ones are narrower by half than the others; the two uppermost opposite, but one of these frequently wanting, so that the leaf then appears to be unequally pinnate; the rest are alternate. The flowers are white, sitting closely on the peduncles. It is a native of South America.

It is the tree which affords, by perforating the trunk, the fluid balsam or resin which thickens by degrees, and is entitled "Balsam of Capevi."

Culture.—It may be increased by sowing the seeds procured from America, or the West Indies, on a bark hot-bed; and when the plants are of a proper size, they should be potted and placed in the bark-bed of the stove, and treated as other plants of the exotic woody kind. It may likewise be raised from cuttings of the young shoots planted in the spring season in pots, plunging them into the hot-bed.

These plants afford variety, in assemblage with others of the same sort.

CORDIA, a genus comprising a plant of the flowering shrubby exotic kind, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a one-leaved, tubular perianthium, toothed at the top, permanent: the corolla one-petalled, funnel-form: tube patulous, length of the calyx: border erect-spreading, cut into five (four or six) obtuse divisions: the stamina have five filaments, subulate: anthers oblong, length of the tube: the pistillum is a roundish germ, acuminate: style simple, length of the stamens, bifid at top; divisions bifid; stigmas obtuse; the pericarpium is a globose drupe, acuminate, growing to the calyx: seed, a nut furrowed, four-celled.

The species mostly cultivated is *C. Sebestena*, Sebesten, or Rough-leaved Cordia.

It has several shrubby stems, eight or nine feet high, having towards the top rough alternate leaves on short petioles, of a deep green on their upper side. The flowers terminating in large clusters upon branching peduncles, sustaining one, two, or three flowers. The corolla is large, with a long tube, spreading open at top, and there divided into five obtuse segments; it is of a beautiful scarlet colour, making a fine appearance. A small piece of the wood thrown on a pan of lighted coals, perfumes the whole house with a most agreeable smell. It is a native of both the Indies.

It is from the juice of the leaves, combined with that of the fruit of a species of fig, that the fine red colour with which they dye their cloths in Otaheite is prepared.

Culture.—It is raised by sowing seed obtained from the West Indies, as soon as possible after they arrive, in pots of light earth, plunging them in a common hot-bed or bark-bed; and when the plants have two or three months' growth, they should be pricked out singly in small pots, replunging them in the hot-bed, to forward their rooting afresh; being afterwards continued constantly in the stove or hot-house. They require frequent watering in the summer.

Plants of this sort are very ornamental in stove-collections.

COREOPSIS, a genus containing plants of the flowering herbaceous perennial kind. Tick-seeded Sun-flower.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositae oppositifoliae*.

The characters are: that the calyx is common, either simple, subimbricate, or doubled: the ex-

terior usually with eight leaflets, which are coarse, and placed in a circle; the interior with as many larger ones, membranaceous and coloured: the corolla compound rayed: corollets hermaphrodite, numerous in the disk: females eight in the ray: proper, of the hermaphrodite tubular, five-toothed: female ligulate, four-toothed, spreading, large: the stamina in the hermaphrodites, filaments five, capillary, very short: anther cylindric, tubular: the pistillum in the hermaphrodites: germ compressed: style filiform, length of the stamens: stigma bifid, acute, slender: in the females, germ like the hermaphrodites: style and stigma none: there is no pericarpium: calyx scarce altered: the seed in the hermaphrodite solitary, orbiculate, convex on one side, concave on the other, with a transverse protuberance at top and bottom, surrounded by a membranaceous edge, with a two-horned tip: in the females none: the receptacle chaffy.

The species cultivated are: 1. *C. verticillata*, Whole-leaved Coreopsis, or Tick-seed Sun-flower; 2. *C. tripteris*, Three-leaved Coreopsis; 3. *C. alternifolia*, Alternate-leaved Coreopsis; 4. *C. lanceolata*, Spear-leaved Coreopsis.

The first has a perennial root, with many tall, stiff, angular stems, upwards of three feet high. The leaves are opposite, often in whorls; leaflets very narrow and entire; the branches opposite; the peduncles long, slender, and one-flowered; the ray yellow; and the disk dark purple. It continues long in flower in the latter end of the summer; and is a native of North America.

The second species has likewise a perennial root; the stems strong, round, smooth, six or seven feet high: the flowers in bunches at the top of the stem, on long peduncles; ray of the corolla pale yellow; disk dark purple. It is a native of North America.

The third has a woody perennial root: the stems several, annual, erect, angular, filled with white pith, winged, from five to ten feet high, simple, having only very short subdivisions at the top into roundish villous peduncles: the leaves are rugged on both sides, of a dirty green colour; the lower ones three or four together, or two opposite, the rest alternate, decurrent. The flowers are large, of a yellowish colour, coming out late. It is a native of Virginia.

The fourth species has several stems, decumbent at bottom, and thence arising obliquely, a foot and a half or two feet in length. At each joint a pair of oblong leaves, with other smaller ones. The peduncles are round and smooth. The florets in the ray eight or nine, broad, with four deep large teeth at the end. It is a native of Carolina, and lasts two or three years.

Culture.—The propagation of these plants is easily effected, either by slipping or dividing the roots in autumn, when the stalks decay, planting them out where they are to remain, keeping them clean from weeds, and cutting down the stalks annually in autumn, when they begin to decay. The third and fourth sorts may be rendered more forward by the use of a hot-bed. They are all well calculated for the more large borders and clumps, introducing them in the vacant spaces between shrubs; as they exhibit a plentiful bloom till late in the autumn.

CORIANDRIUM, a genus containing a plant of the herbaceous culinary annual kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatae*.

The characters are: that the calyx is an universal umbel, with few rays: partial with very many: involucre universal scarce one-leaved: partial three-leaved, halved, linear: the perianth proper five-toothed, standing out: the corolla universal difform, rayed: floscules of the disk abortive: proper of the disk hermaphrodite: petals five, inflex-emarginate, equal: proper of the ray, hermaphrodite: petals five, inflex-hearted, unequal, of which the exterior is very large, two-parted; but the nearest lateral ones have a very large division: the stamina have five simple filaments: anthers roundish: the pistillum is an inferior germ: styles two, distant: stigmas of the ray headed: there is no pericarpium: fruit spherical bipartite: the seeds two, hemispheric and concave.

The species cultivated is *C. sativum*, Common or Great Coriander.

It has an annual small root; the stem a foot or a foot and half in height, smooth and branched: the root-leaves larger, doubly pinnate: pinnules broad, gashed on every side, serrate and even half-two-lobed: upper leaves very finely divided, also doubly pinnate: the pinnules linear, slender, divided into two or three segments: petals white, or reddish. It flowers in June and July; and the seeds ripen in July and August.

The leaves have a strong disagreeable scent; but the seeds are grateful to the taste, and, when incruusted with sugar, sold by the confectioners. They, as well as the plant, are also sometimes used for culinary purposes.

Culture.—This is managed by sowing the seed in the spring, or beginning of summer, in shallow drills, half an inch deep, and six inches asunder, keeping them afterwards free from weeds. As the plants soon run up to seed, five or six sowings should be made, from March till the latter end of summer, the last on a warm border, or in a bed to be defended with a frame, &c., in order

to provide young green leaves more conveniently, as they may be wanted in winter.

When cultivated for seed, it should be sown early in March, either in drills a foot apart, or broad-cast, and raked in: when the plants are an inch or two in height, they should be hoed to six or eight inches distance. They produce ripe seed about August; when the seed-stems should be carefully pulled or cut in proper time: as the seeds are but slightly attached, if particular care is not taken in gathering soon enough, and cutting the stalks, a great part sheds and is lost. When cut, they should be put into a cloth, and thrashed out as soon as possible. The young leaves are used as culinary herbs, and the seeds for different purposes.

It is a proper plant for shrubbery borders, and clumps, to increase the variety, where its creeping roots send up many small suckers for future increase.

CORIARIA, a genus comprising a plant of the deciduous flowering hardy shrubby kind.

It belongs to the class and order *Dioecia Decandria*.

The characters are: that in the male the calyx is a five-leaved perianth, very short: leaflets subovate, concave: the corolla has five petals, very like the calyx, connected: the stamina consist of ten filaments, length of the corolla: anthers oblong, two-parted: in the female, the calyx is a five-leaved perianth very short; leaflets subovate, concave: the corolla has five petals, cuspidate, calyciform, converging: the stamina consist of ten filaments (five within the calyx; five within the petals) very short: anthers barren: the pistillum has five germs, compressed, inwardly conjoined: styles as many, bristle-form, long: stigmas simple: there is no pericarpium: five fleshy, ovate-lanceolate, three-sided petals, with one of the angles looking inwards, covering the seeds: the seeds five, kidney-form.

The species mostly cultivated is *C. myrtifolia*, Tanner's or Myrtle-leaved Sumach.

It is a shrub which seldom grows more than three or four feet high. It creeps at the root, and sends forth many stems. In the male plant, the flower-buds are often in pairs from the scar of the fallen leaves. Male aments, cylindric, opposite, in pairs (one from each bud), leafless: pairs from one to five, below the polygamous aments: the flowers are separated by fleshy, concave scales: the hermaphrodite buds also solitary or in pairs, above the former, in several pairs; some males being mixed with the hermaphrodites. The other buds, occupying the ends of the branches, have male flowers only, in leafless aments.

In the female plant, very many flower-buds are placed along the branches, opposite by pairs:

aments long, peduncled, more leafy, having from one to four leaves, the outmost gradually larger: the raceme looser, few-flowered; the scales separating; the flowers narrower and more acuminate.

It is a native of the South of France, &c. flowering from May to August. It is used in tanning leather, and in dyeing black.

Culture.—This is a plant easily increased by suckers taken from the root, which it affords plentifully, and which may be taken off with fibres to them in the autumn or winter. It may likewise be raised from layers made in autumn, and taken off in the following autumn, being then planted out where they are to remain.

CORK TREE. See **QUERCUS**.

CORNELIAN CHERRY. See **CORNUS**.

CORNUS, a genus comprehending plants of the hardy deciduous shrubby kinds.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Stellatæ*.

The characters are: that the calyx is an involucre generally four-leaved, many-flowered: leaflets ovate, the opposite ones smaller, coloured, deciduous: perianth very small, four-toothed, superior, deciduous: the corolla has four petals, oblong, acute, flat, smaller than the involucre: the stamina consist of four subulate filaments, erect, longer than the corolla: anthers roundish, incumbent: the pistillum is a roundish inferior germ: style filiform, length of the corolla: stigma obtuse: the pericarpium is a roundish drupe, umbilicated: the seed is a heart-shaped, or oblong, two-celled nut.

The species cultivated are: 1. *C. sanguinea*, Common Dog-wood: 2. *C. florida*, Great-flowered Dog-wood: 3. *C. alba*, White-berried Dog-wood: 4. *C. sericea*, Blue-berried Dog-wood: 5. *C. mascula*, Cornelian Cherry.

The first rises to the height of from four or five to eight or ten feet: the leaves are opposite, quite entire, but sometimes with the edge waving, strongly nerved, slightly pubescent on both sides, two inches and a half long, one and a half broad: petioles smooth, furrowed above, and four lines in length: the peduncles axillary, leafless; pedicels short and very close together: forming a five-cleft cyme, again subdividing: some of the flowers are female, and the fruit round, obscurely umbilicate, very dark purple: the pulp soft and bitter. It is a native of Europe; flowers in June, the berries ripen in August.

The second species seldom rises above seven or eight feet high, but is generally well furnished with large leaves: the branches are terminated by large white flowers, having a very large involucre, being succeeded by clusters of dark red berries. It flowers in April and May, but not

very plentifully here: it is however very hardy, and known in the nurseries by the title of Virginia Dog-wood.

There is a variety with a rose-coloured involucre.

The third species has much resemblance to the first; differing only in its recurved branches and white berries: the stem is woody, putting out many lateral branches near the ground, so that, unless it is trained while young, it generally spreads low: the branches during summer are brownish, but in winter change to a fine red: the flowers are produced in large cymes at the extremity of every shoot, towards the end of May, and are white: the fruit also becomes finally white: these shrubs produce fruit the best when planted in stiff ground. It is a native of North America.

The fourth is a shrub which grows two fathoms in height, with an upright, round, branched, gray stem: the branches are opposite, round, spreading, dusky purple: shoots round, with a ring at the joints, almost without spots, and dark red, as in the first, the younger ones more or less pubescent: the leaves acuminate, entire, nerved: they are narrower, and deeper veined than in the third: the flowers grow in smaller cymes: the fruit is smaller, and of a deep blue colour when ripe: the shoots are of a beautiful red colour in winter; and in summer, from the leaves being large, of a whitish colour on their under side, and the bunches of white flowers at the extremity of every branch, it becomes a valuable shrub; and in autumn, when the large branches of blue berries are ripe, it makes a fine appearance. It is a native of North America.

The fifth species, in its wild state, is a shrub, four or five feet in height; but when cultivated it advances into a tree twenty feet high. The shoots are ash-coloured and pubescent: the leaves are in pairs, ovate-lanceolate, subhirsute: the flowers come out very early in the spring, before the leaves: the leaflets of the involucre are lanceolate, often reflected and permanent: the peduncles are one-flowered, somewhat villose, from twelve or fifteen to thirty in an umbel: the fruit is oblong, and of a high shining scarlet colour, the size and form of a small Olive Acorn. It is a native of France, &c., flowering in mild seasons early in February.

Culture.—These plants may be raised either by seeds, layers, or cuttings. In the first method, the seed of the American kinds should be sown as soon as possible in spring, in a bed of good earth, half an inch deep; but they may be sown in autumn probably with more advantage.

The Cornelian Cherry, and common Dogwood, and all those sorts that ripen seeds in this climate,

should be sown in the autumn; and they will for the most part rise the succeeding spring.

When the plants are a year old, they should be planted out in nursery-rows; and when they are from two to four or five feet high, they are proper for being removed into the shrubbery, clumps, and other places.

In the second mode, the shoots of the year should be laid down in autumn; and they will be well rooted, and fit to remove the following autumn.

Cuttings of the strong shoots of the same year, ten or twelve inches long, should be planted three parts in the ground in the autumn, and in the autumn following, when well rooted, removed and planted out as above. Suckers from the roots planted in the same way also make good shrubs.

All these shrubby trees are proper for large shrubberies, wilderness-works, and other ornamented grounds, where they effect a fine variety by their leaves and numerous flowery umbels in summer, as well as their clusters of berries in autumn; and in the Dog-wood kinds, by their beautiful red shoots in winter, when their leaves are fallen. They all succeed in any common soil and exposure, and require no culture, but to permit them to assume their natural growth; only just cutting off any rambling side shoots, and clearing away suckers from the roots, and the dead wood from the branches or other parts.

CORNUTIA, a genus containing a plant of the shrubby kind for the stove.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a one-leaved, roundish perianth, very small, tubular, five-toothed, permanent: the corolla is one-petalled, ringent; tube cylindric, much longer than the calyx: border four-cleft, upper division erect, roundish; lateral ones distant; lower roundish, entire: the stamina have four filaments, of which two project beyond the tube of the corolla: anthers simple, inclining: the pistillum is a roundish germ: style very long, two-parted: stigmas thickish: the pericarpium is a globose berry, at the base comprehended by the calyx: the seed single, kidney-form: calyx five-toothed: stamina longer than the corolla: style very long: the berry one-seeded.

The species mostly cultivated is *C. pyramidalis*, Hoary-leaved Cornutia.

In its native situation it rises to the height of ten or twelve feet: the branches are four-cornered, and grow straggling: the leaves are opposite, ovate, hoary, on very short petioles, acuminate, deciduous: the petiole in falling is broken off a line distant from the branch, and

remains a hard, truncate, blunt, perennial process, supporting the branches that come out from the axils: the flowers are in corymbs at the ends of the branches; of a fine blue colour, usually appearing in autumn, and sometimes remaining in beauty two months, or longer. It is a native of America.

Culture.—It is propagated either by seeds or cuttings. In the first mode the seeds should be sown in the spring, in pots of light earth, and, when the plants are of sufficient growth, removed into separate pots, replunging them in the bark-bed of the stove, where they are to remain.

The cuttings should be planted in pots of light earth, at the same season, and managed afterwards in the same manner as the above.

These plants afford variety in assemblage with other stove exotics.

CORONILLA, a genus comprising plants of the evergreen and deciduous shrubby kinds.

It belongs to the class and order *Diadelphica Decandria*, and ranks in the natural order of *Papilionaceae*.

The characters are: that the calyx is a simple umbellule: perianth one-leaved, very short, compressed, bifid, erect; the three inferior teeth smaller; the two superior conjoined; permanent: the corolla papilionaceous: standard heart-shaped, reflected on all sides, scarce longer than the wings: wings ovate, converging at top, gaping at bottom, obtuse: keel compressed, acuminate, ascending, usually shorter than the wings: the stamina consist of diadelphous filaments (single and nine-cleft), ascending at almost a right angle, the tips widish; anthers simple, small: the pistillum is a columnar, oblong germ: style bristled, ascending: stigma small, obtuse: the pericarpium is a legume, very long, columnar, straight, contracted with an isthmus between each seed; two-valved, one-celled, parting by joints: the seeds many.

The species are: 1. *C. juncea*, Linear-leaved Coronilla; 2. *C. Valentina*, Small Shrubby Coronilla; 3. *C. argentea*, Silvery-leaved Coronilla; 4. *C. glauca*, Great Shrubby Coronilla; 5. *C. Emerus*, Scorpion Sena.

The first rises from two to four feet high, with many slender woody branches, as in broom: the leaves are linear, spear-shaped, small, and somewhat fleshy: the flowers stand upon pretty long axillary peduncles, in small bunches, are of a bright yellow colour, and appear for six or seven months together, but have not produced seeds in this climate. It is a native of the South of France.

The second species rises three or four feet high: the leaflets nine or eleven, oblong-cordate or wedge-form retuse, with a small point or

none, glaucous, somewhat fleshy, having the colour of rue in the early spring: the flowers are on long axillary peduncles in close bunches, small and deep yellow. It has a strong odour, and is a native of Spain.

The third is a very humble shrub, rarely growing more than two feet high, when planted in a good soil; but in a dry barren place, not much above one foot: the stem is hard and woody, from which the branches are produced on every side near the ground, so as to form a low bushy shrub. At the joints where the leaves are produced are two ear-shaped stipules. The flowers are on long slender axillary peduncles, yellow, and have a strong sweet scent: it produces plenty of flowers in May, making a fine appearance; the seeds ripening in August. Its silvery colour is said to be occasioned by its growing on a poor dry soil. It is a native of the island of Crete.

The fourth species seldom grows more than three or four feet high, with a woody branching stem: the leaflets five or seven, glaucous, wedge-form, seldom obcordate, with a small reflex point: the flowers bright yellow, in a roundish bunch: they are remarkably fragrant during the day. It is a native of the South of France.

The fifth rises from two to six feet in height (eight or nine in gardens): the stem not very straight, branched and brachiate (so weak as sometimes to want support): the leaflets three or four pairs, gradually larger, almost cordate, glaucous and smooth: the peduncles umbelled, with from three to five yellow flowers. Miller kept this species under its old name of *Emerus*, dividing it into greater and less; the former being common in gardens, but the latter in very few. It is a native of France, flowering in April.

Culture.—As the first four sorts, and especially the second, are rather tender, though they will succeed in the open air in mild winters, they should in common be potted, to be moved to the shelter of a green-house, or glass frame, or some place in a sheltered situation in the full ground. The last sorts are hardy and elegant flowering-shrubs, for the clumps and other parts of extensive pleasure-grounds.

The four first kinds may be increased by seeds sown in the spring, either on a warm border, or in a slender hot-bed; but the latter is the best mode, as it produces them more forward, in pots of rich earth half an inch in depth, plunging them in a hot-bed when necessary. When the plants are two or three inches in height, they should be pricked out in separate small pots, giving shade, water, and air, hardening them gradually to the full air, about the middle of summer, in which they may remain till autumn, then removing them to the shelter of a frame

during winter, covering them only in time of frost, or very severe weather.

The last sort, or Scorpion Sena, may be raised plentifully both by seeds, layers, and cuttings; the seeds being sown in March, in a bed of light earth, and covered half an inch deep, giving occasional waterings in dry weather. When the plants have had one or two years' growth, they should be removed into nursery rows, and in two or three more they will be large enough for planting in the shrubbery, or other places. The layers of the young shoots may be laid down in autumn or winter, giving them a gentle twist. When they are perfectly rooted, they should be taken off, and planted out as above. The cuttings of the young shoots should be planted in the spring, or autumn, in shady borders, giving water the following spring and summer. When well rooted they should be removed, as in the above methods.

CORTUSA, a genus containing a plant of the low flowering herbaceous biennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Precieæ*.

The characters are: that the calyx is a five-cleft perianth, spreading, very small, permanent: divisions lanceolate, three-toothed: the corolla one-petalled, wheel-shaped: tube scarce any: border flat, five-parted, ample; divisions ovate, acute; throat with an elevated ring: the stamina consist of five obtuse filaments; anthers two-plated, oblong, erect, affixed to the outward part: the pistillum is an ovate germ: style filiform, longer than the corolla: stigma almost headed: the pericarpium is an oval capsule, acuminate, half-five-valved: the seeds numerous, compressed, cornered: the receptacle is columnar and free.

The species cultivated is *C. Matthioli*; Bear's Ear Sanicle of Matthioli.

It sends out many oblong smooth leaves, a little indented on the edges, and forming a sort of head like the auricula. The peduncles come out in the centre of the leaves, rise about four inches high, and support an umbel of flowers, each on a slender short pedicel; they are of a flesh colour, and spread open like those of the auricula. It is a native of the Alps, &c. flowering in April and May; being, according to some, biennial.

Culture.—These are plants which require some trouble in preserving in the garden, as they stand in need of shade and a poor sandy soil, as well as frequent waterings.

They are increased by parting the roots in the beginning of autumn, in the same manner as is practised for the auricula.

These are low ornamental plants.

CORYLUS, a genus comprising plants of the hardy deciduous shrubby-tree kind. The Hazel or Nut Tree.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the male flowers are disposed in a long ament: the calyx is an ament common imbricated on every side, cylindric, permanent: the scales one-flowered, narrower at the base, wider at the top, and more obtuse, inflex, three-cleft; middle division equal in length to the others, but as wide again, and covering the others: there is no corolla: the stamina consist of eight filaments (six or eight), very short, growing to the interior side of the calycine scale; anthers ovate-oblong, shorter than the calyx, erect; female flowers remote from the males, on a very small subglobular ament, in the same plant, sessile, included within the bud: the calyx is a two-leaved perianth (one-leafed), leathery, lacerated on the margin, erect, length of the fruit; during the time of florescence scarcely visible, on account of its smallness: there is no corolla: the pistillum is a roundish germ, very small: styles two, setaceous, much longer than the calyx, coloured; stigmas simple: there is no pericarpium: the seed is an ovate nut, scalped as it were at the base, but little compressed at the tip, slightly pointed.

The species cultivated are: 1. *C. avellana*, Common Hazel-nut Tree; 2. *C. rostrata*, American Cuckold-nut Tree; 3. *C. Colurna*, Constantinople or Byzantine Hazel-nut Tree.

The first is properly a shrub: the stem is covered with a whitish cloven bark, which is smooth on the branches, frequently of a bay colour, and spotted with white; on the shoots it is sometimes smooth, sometimes hairy, ash-coloured and green, with white tubercles: the leaves are alternate, gash-serrate, wrinkled, with hairs on both sides standing out, dark green above, bright green beneath, on very hairy round petioles, half an inch in length. The male catkins appear in autumn, and wait for the expansion of the female germs in the spring: the styles are of a bright red colour, long and setaceous: the flowering branches, especially those which bear the fertile flowers, are set with short fine hairs terminating in globules: the catkins are in pairs of a yellowish green colour.

There are several varieties and sub-varieties of this plant, as, with white-skinned kernels, with red-skinned kernels; great cob-nut with large round fruit; cluster-nut with the fruit in clusters at the ends of the branches; long nut, which is rounded and broadish at top; Barcelona or Spanish nut, which is large, roundish, and well kernelled; the filbert, which has the tree more

erect than the common hazel, and of which there are white-skinned and red-skinned sub-varieties.

The second species has an upright stem dividing into a branchy head: the leaves are oblong, heart shaped and acute, the length of the calyx-being such as to cover the nut entirely even after it is ripe, and rostrated. It is a native of Virginia.

The third has the stem upright and shrubby, branching to the height of four or five feet: the leaves are a little laciniated at top: the raceme of nuts very large: the nuts roundish, and in shape like those of the common hazel, but more than twice their size: the cups or involucre very large, so as almost to cover the nut, and deeply cut at the brim. It is a native of Constantinople.

Culture.—All these different sorts may be easily increased, either by planting the nuts, layers, suckers of the roots, grafting, or budding; but the second is the best and most safe method for continuing the sorts.

In the first mode the nuts should, after being preserved in an airy shed or cellar, in sand, be planted in drills in the spring to the depth of about two inches, and a foot apart. When they have had a twelvemonth's growth, they should be removed into nursery rows, at the distance of two or three feet, and a foot apart in the rows, training them according to the purpose for which they are wanted, as standard trees, half-standards or dwarfs, for one or two years, when they will be proper for removing into the situations where they are to remain.

For the first purpose, they should be trained with a single stem five or six feet high, at which height they should be suffered to branch out and form a head, according to their natural growth; but for half-standards, a three or four feet stem is sufficient; and for dwarfs, they should be trained with a single stem to a foot and a half or two feet in height, then topped, that they may branch out, and form a low spreading head.

This mode cannot, however, be fully depended on for producing the same sorts with certainty.

In the second mode, some of the lowest young branches, which have plenty of young shoots, should be laid down in the autumn or winter season; and when they have become perfectly rooted, they may be taken off and planted out in nursery rows at the distance of two feet, and twelve inches apart in the rows; the plants being trained as above.

When large supplies are wanted, the best way is, however, to form stools, by heading down a few trees, nearly to the surface of the ground, the preceding year; as by this means abundance

of shoots may be provided. In this way, and by suckers, grafting, and budding, the sorts and varieties may be preserved with certainty.

The suckers arising from the roots of trees raised in either of these methods, when taken up in autumn, winter, or early spring, with good radical fibres, grow freely and form good plants, which should be planted at once where they are to remain when large, and the smaller sizes in nursery rows, till of proper growth.

This mode of raising the plants is chiefly adopted in Kent, where large quantities are cultivated.

The grafting and budding of these trees may be performed on stocks of any of the kinds during the early spring months. See GRAFTING and BUDDING.

The kinds most deserving of cultivation are the Cluster Large Cob, Barcelona, and the two varieties of Filbert Nuts; which may be planted after having been trained in any of the above modes.

The filbert sorts, which are in the most common culture, may be planted as standards in rows, ten, fifteen, or twenty feet distance, by twelve feet in the lines, and trained to single stems to four, five, or six feet in height, and with branchy, full spreading heads; or in the hedge manner, either in single rows, to run up in their natural growth, or in a double row, ten or twelve feet between, to form shady filbert walks, in all of which modes they bear abundantly; but the detached single standards commonly produce the largest and finest nuts.

It is observed in the Annals of Agriculture, that in Kent, where this sort of fruit is much grown, the trees are never suffered to rise above six feet in height, and are regularly pruned like gooseberry bushes. They are planted at the distance of twelve feet, and, when full spread, the heads are formed by the branches six feet in diameter. The inter-spaces are cultivated with hoeing crops, the vigour of the trees depending much on the stirring of the ground. The soil on which they succeed best is a strong loam, on which they bear greatly; the fruit being large and fine, and not maggoty.

They are sometimes planted to form a kind of hedge, setting them at five feet distance, and leaving them to nature, to shoot from the bottom, sides, and tops, in their own manner; but in this way they do not, in general, produce such large, fine fruit, as trees with one stem, standing at such distances that their heads have full scope to spread out regularly in different directions.

Where full plantations of these trees are wanted, they should be planted in rows, at not less than fifteen or twenty feet distance, or less than ten or fifteen feet asunder in the rows.

All the culture such trees require, after being planted out where they are to remain, is to clear the bottoms annually from suckers arising from the roots, and the stems from all side shoots; the heads being mostly suffered to take their natural growth, except just retrenching the rambling shoots or branches.

Some of the other species may be planted with much advantage and effect in the borders, clumps, and other parts of ornamented grounds, where there is sufficient room.

CORYPHA, a genus containing plants of the perennial exotic kind. Fan Palm.

It belongs to *Appendix Palmæ*, and ranks in the natural order of *Palmæ*.

The characters are: that the calyx is a spathe universal compound: spadix branching: the corolla three-parted: petals ovate, obtuse, spreading: the stamina have six filaments, subulate, longer than the corolla: anthers caudate: the pistillum is a roundish germ: style subulate, short: stigma simple: the pericarpium is a globose berry, large, one-celled: the seed single, bony, large, globose.

The species are: 1. *C. umbraculifera*, Great Fan Palm; 2. *C. minor*, Smaller Fan Palm.

The first, in its native situation, is described as growing to a large tree: the leaves pinnate-palmate, very large and broad, and, when dried, folding up in the manner of a fan: they grow quite on the top of the tree: it scarcely flowers before it is of thirty or forty years growth, when it produces numerous beautiful yellow blossoms in great spreading branches, succeeded by much fruit. It is a native of Malabar.

The second has a spreading root, sending up frondose foot-stalks, with large palmate-fan-shaped, plaited leaves, from eighteen inches to two feet long, and near eighteen inches broad, opening like a fan, and putting forth between the leaves a spathe protruding a spadix of flowers, which are succeeded by a smooth, black, sweet fruit, the size of a pea. It is a native of India.

Culture.—These plants may be increased, either by seeds, or slips from the crowns of the roots: the seeds, should be procured from abroad, and sown in pots of sandy light earth, plunging them in a hot-bed, and giving occasional waterings; and in the autumn or spring following, the plants will be fit to be removed into separate pots. The off-sets slipped from the crowns of the roots should be separated with fibres to them, planted in pots in the spring, being plunged in a hot-bed.

They require to be kept constantly in the stove, and to have the management of other exotic plants of similar growth.

COTYLEDON, a genus affording plants of the succulent perennial hardy kind, for the greenhouse and stove.

It belongs to the class and order *Decandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved, five-cleft perianth, acute very small: the corolla is a five-cleft bell-shaped petal: nectary consisting of a concave scale, seated at the exterior base of each germ: the stamens consist of ten filaments, subulate, straight, the length of the corolla: anthers erect, four-furrowed: the pistillum has five germs, oblong, thickish, ending in subulate styles, which are longer than the stamens: stigmas simple: the pericarpium consists of five capsules, oblong, bellied, acuminate, one-valved; gaping longitudinally inwards: the seeds very many and small.

The species are: 1. *C. orbiculata*, Round-leaved Navelwort; 2. *C. spuria*, Narrow-leaved Navelwort; 3. *C. hemispherical*, Knife-leaved Navelwort; 4. *C. Laciniata*, Cut-leaved Navelwort.

The first rises with a short thick succulent perennial stalk, which rarely exceeds a foot in height, branching out on every side, so as to spread over the pots in which it is planted. The branches become woody by age, and are closely beset by thick round leaves of a grayish colour, with purple borders, plane on their upper side, convex on the under, and very fleshy; of an herbaceous colour within, and full of moisture. There are clusters of pale yellow flowers at the ends of the branches. It is a native of the Cape; flowering from July to the beginning of autumn.

The second species has a short greenish succulent stalk, seldom more than a span high, dividing into several irregular branches: the leaves thick, succulent, four inches long, half an inch broad, and as much in thickness, having a broad concave furrow on their upper side, and convex on the under; bright green, with a purple tip: the peduncles terminating, near a foot high: the flowers on short pedicels, yellow: tubes long, brims reflex, tipped with purple.

The third has a thick succulent stalk, rarely more than a span high, dividing into many branches: the leaves are short, thick, succulent, not more than half an inch long, and a quarter of an inch broad, grayish, with green spots, sessile: the peduncles terminating, six inches long, naked, supporting five or six flowers, alternate, sessile, greenish, with purple tips.

The fourth has the stem upright, about a foot high, jointed and succulent: the leaves broad, deeply cut on their edges, of a grayish colour, opposite almost embracing: peduncles terminating, about six inches long, sustaining seven or eight small flowers of a deep yellow colour. It is a native of Egypt, &c. flowering in July and August.

Culture.—All these sorts are easily increased by cuttings of their young succulent branches

planted out in the spring or summer months, after being exposed for a week or ten days to heal over the cut parts, in pots of dry sand or compost; placing them either in the green-house, or a frame, to have shelter from wet, and occasional shade; but it is of great advantage to plunge them in a bark-bed, or other hot-bed, in forwarding their striking roots, giving occasional shade, and water once a week: they should be hardened to the full air during the summer months.

They afford ornament and variety among other green-house plants.

COVENTRY BELLS. See CAMPANULA.

CRAMBE, a genus affording plants of the esculent and shrubby exotic kinds.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate, cannelled, somewhat spreading, deciduous: the corolla four-petalled, cruciform: petals large, obtuse, broad, spreading: claws erect-spreading, length of the calyx: the stamens have six filaments, two the length of the calyx, four longer, with a two-cleft tip: anthers simple, on the exterior branch of the filaments: a melliferous gland between the corolla and the longer stamens on each side: the pistillum is an oblong germ: style none: stigma thickish: the pericarpium is a dry berry, globose, one-celled, deciduous: the seed single and roundish.

The species are: 1. *C. maritima*, Sea Cabbage, or Colewort; 2. *C. fruticosa*, Shrubby Sea Cabbage, or Colewort; 3. *C. strigosa*, Rough-leaved Shrubby Sea Colwort.

The first has roots creeping under ground, by which it propagates fast: the whole plant is smooth: the lower leaves are petioled, very large, and spreading on the ground, variously waved, jagged and indented; smooth, glaucous, sometimes tinged with purple: many stalks arise among these, two feet high, spreading and much branched bearing similar but sessile leaves: the flowers on long peduncles, white. It is a native of the beachy coasts of Sweden, &c.

The second species is a stiff shrub, with leafy branches: leaves alternate, petioled, deeply toothed, pinnatifid, or pinnate, with the divisions serrate; hoary: the branchlets terminate in a large, diffused panicle, with alternate, divaricate, racemed branchlets; the racemes short. It is a native of Madeira; flowering most part of the year.

The third is a rugged shrub: the stem erect, round, loosely branched, ash-coloured, the height of a man: the leaves alternate, oblong ovate, either undivided or eared, obliquely subcordate acuminate, unequally toothed, wrinkled, nerved, bright green on both sides, spreading, reclined, and four times as large as those of the second:

petioles round on one side, channelled on the other, strigose: panicles terminating, very long, composed of alternate compound racemes, peduncled, divaricate: flowers pedicelled, erect and white. It is a native of the Canary Islands; flowering in May and June.

Culture.—The most proper soil for raising the first sort, is that of the sandy or gravelly kind. The usual method of cultivating it is, by sowing the seed in drills upon raised beds, about four feet and a half wide, with alleys of two feet between them, either in the autumn or spring. The ground should be prepared, by digging it well over to the depth of two feet, and reducing it well in the operation. It should then be formed into beds of the above breadth, and three shallow drills be made length-ways by a line on each; the seeds being thinly scattered in, and covered to the depth of about an inch, and the whole raked even. As soon as the plants are up, they should be thinned out, by removing the weakest to the distance of eight or ten inches, and kept perfectly free from weeds, by occasional hoeing in the summer season. In the beginning of the following autumn, the decayed stems should be cleared away, and light earth from the alleys be laid over the beds, to the depth of two or three inches. The following spring and summer, the plants should be kept clear from weeds, and earthed up in the autumn to the depth of three or four inches with light sandy earth. In the second spring, some of the roots are often in a state to be cut; but it is the best practice to repeat the same management in the autumn, and let them remain till the third spring, when they will be large, and in full perfection.

The author of the "Philosophy of Gardening," on the authority of a friend, has suggested another method of raising and blanching crops of this sort, which is by sowing the seed about the beginning of April in drills, the plants being earthed up and kept clean from weeds. In the beginning of autumn, the roots of the plants should be removed into high beds, one row of them being planted on each, at the distance of about a foot, being well earthed up in the winter. The driest ground should be chosen for this purpose. It is not in a state to be eaten till the third year after being sown. The year before cutting, it is directed to be "covered up in the beginning of winter, first with stable dung, kept from pressing on it, by a few sticks placed like a cone over each root, then with long litter, two or three feet high, the higher the better, as the more it is forced the earlier it is fit to be gathered, and the whiter it will be." In this culture, it may be begun to be gathered about the beginning of January, and continued till May, one bed being kept under another.

Beds planted in either of these methods will continue for a great number of years, producing crops annually, care being taken to keep the plants clean from weeds, and in the former well earthed up in the autumn, to blanch the roots, stirring the surface a little with a fork in the spring, and raking the surface even.

In this mode of culture, some also advise the beds to be covered in winter with dry rotted dung, to promote the growth of the plants, as well as protect them from frost, removing the more coarse part as the spring approaches, in order to loosen the surface, and render it even.

In gathering the shoots, the earth should be opened, and the shoots cut some inches below the surface.

The author of *Phytologia* remarks, that this is an excellent vegetable at an early season, when boiled, and served up as asparagus; and that the young heads, without being blanched, are "equal, or superior to most kinds of brocoli."

When cultivated for the purpose of ornament, the seeds should be sown where the plants are intended to remain in the early spring months; or on beds, in order to be transplanted in the autumn.

The two last species may be increased by planting cuttings of the young shoots in the spring, or summer season, in pots filled with light sandy earth, watering them sparingly, and giving them the protection of the greenhouse in winter.

They are very ornamental among collections of this sort of plants.

CRASSULA, a genus containing plants of the succulent kind for the greenhouse and stove. Lesser *Orpine*, or *Live-Ever*.

It belongs to the class and order *Pentandria Pentagynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved perianth, five-cleft; divisions lanceolate, channelled-concave, erect, acute, converging into a tube, permanent: the corolla has five petals, claws long, linear, straight, converging, connected at the base with the ovate bractes at the border, reflex-expanding: nectaries five; each with a very small emarginate scale, annexed outwardly to the base of the germ: the stamina consist of five subulate filaments, length of the tube, inserted in the claws of the corolla: anthers simple: the pistillum has five germs, oblong, acuminate, ending in subulate styles the length of the stamens: stigmas obtuse: the pericarpium consists of five capsules, oblong, acuminate, straight, compressed, gaping inwards lengthwise: the seeds many and small.

The species are: 1. *C. coccinea*, Scarlet-flowered *Crassula*; 2. *C. perfoliata*, *Perfoliate Shrubby*

Crassula; 3. *C. cultrata*, Sharp-leaved Crassula; 4. *C. punctata*, Dotted-leaved Crassula; 5. *C. nudicaulis*, Naked-stalked Crassula; 6. *C. orbicularis*, Starry Crassula.

There are several other species that may be cultivated.

The first has a reddish jointed stem, about three feet high, dividing at top into many irregular branches: the leaves so closely opposite, as to appear to be in four rows: the flowers at the ends of the branches in close umbels, of a fine scarlet colour. It flowers in July and the following month.

The second species rises with an upright stem ten or twelve feet high, if it be not broken or injured, but requires support; the stems being slender, and the leaves very weighty: the latter are about three inches long, thick, succulent, pale green, acute, hollowed above, and having a convex ridge beneath: the flowers terminating in large clusters, of a whitish herbaceous colour, with short tubes, and the brim cut into five parts. The flower-stalk is thick and succulent, generally turning first downwards, then upwards again, somewhat in the form of a syphon. It flowers in July, but does not produce seeds in this climate.

The third has a weak succulent stalk, about two feet high, sending out many irregular branches: the leaves thick, plane above, convex beneath, deep green, the borders set with a few silvery hairs: the stalk which supports the flowers rises from the top of the branches, and is from four to six inches long, putting out several side branches, which grow erect; these are terminated by large clusters of small greenish flowers, which appear in June and the following month, but the flower never fully expands.

In the fourth species, the stems are very slender, full of joints, and trailing: the leaves thick, succulent, heart-shaped, connate, grayish, in a double row, hollow dotted: the stems are divided, grow about eight or nine inches long, and are terminated by clusters of small white flowers, sitting very close to the top: these appear in spring, and again in the latter part of summer.

The fifth never rises with a stalk, but the leaves come out close to the ground, forming a sort of head; they are smooth, somewhat hairy, set with excavated dots, succulent, taper, ending in points, and frequently put out roots. Out of the centre of these arises the flower-stalk, branching into two or three shoots at top, each terminated by clusters of greenish flowers, which do not open. It flowers in May, and sometimes again towards the latter part of summer.

The sixth species is a low perennial plant,

having open spreading heads, very like those of some sorts of Houseleek, growing on the ends of very slender trailing stalks, produced in plenty on every side the parent plant, as on the Childing Marigold. The flower-stalks arise from the centre of these heads; are naked, about four inches long, and terminated by close clusters of herbaceous flowers: the leaves are radical, forming roses, ovate, fleshy, gibbous, even, sharpish, ciliate backwards, with cartilaginous, very slender hairs: the root puts forth lateral threads, which are filiform and decumbent, forming runners at the end. It flowers sometimes in May, but usually in July and August.

Culture.—The first three sorts may be easily increased, by planting the cuttings of the stems and branches in the later spring and summer months, after having been exposed in a dry situation for a few days, to heal over the cut parts, in pots filled with sandy earth, plunging them in the bark-bed of the stove, or in a frame shaded from the sun. When well rooted, they should be removed into separate pots, and replaced in the same situations till fully established, when they may be removed into the greenhouse, where they should have a sunny situation in winter, and but little water.

The other species may be increased by planting the off-sets from the roots in the same manner as above.

As these are plants of a succulent nature, both in their stems, branches, and leaves, as well as of curious growth, they afford variety among collections of other plants of similar kinds. They are capable of bearing the open air in summer, in dry warm situations.

CRATÆGUS, a genus affording plants of the hardy deciduous tree and shrub kinds. Hawthorn and Wild Service Tree.

It belongs to the class and order *Icosandria Digynia*, and ranks in the natural order of *Pomaceæ*.

The characters are: that the calyx is a one-leaved perianth, concave-spreading, five-cleft, permanent: the corolla has five roundish petals, concave, sessile, inserted into the calyx: the stamina consist of twenty subulate filaments, inserted into the calyx: anthers roundish: the pistillum is an inferior germ: styles two, filiform, erect: stigmas headed: the pericarpium is a fleshy, roundish berry, umbilicated: the seeds two, somewhat oblong, distinct, and cartilaginous.

The species cultivated are: 1. *C. oxyacantha*, Hawthorn or Whitethorn; 2. *C. aria*, White Beam, or White-leaf Tree; 3. *C. torminalis*, Wild Service, Sorb, or Maple-leaved Service; 4. *C. coccinea*, Great American Hawthorn; 5. *C. viridis*, Green-leaved Virginian Hawthorn; 6. *C. Crus Galli*, Cockspur Hawthorn; 7. *C. tomen-*

tosa, Woolly-leaved Hawthorn; 8. *C. Azarolus*, Parsley-leaved Hawthorn, or Azarole.

The first rises with an ascending, round trunk, very much branched: the bark is smooth: at the base of each petiole are two semiorbicular stipules, deeply toothed, acuminate at top: thorns sharp (coming out from between the stipules): the leaves are trifid, petioled, decurrent, sharp at the base, shining, the middle segment trifid, very entire about the edge (commonly in the upper floral leaves, but serrate in the branch leaves): the peduncles are branched, with two or three flowers on each division, of a white colour, succeeded by bunches of dark red berries. It flowers in May.

There are varieties, with large, oblong, smooth, bright scarlet fruit, with buds appearing of a fine yellow, and the fruit of a golden colour, being retained all the winter, with white berries, with double blossoms in large bunches. The Maple-leaved, at first of a pure white, then turning to a faint red, and the Glastonbury or Early-flowering Thorn.

The second species is a tree, which rises to the height of thirty or forty feet, with a large trunk, dividing into many branches; the young shoots have a brown bark, covered with a mealy down: the leaves are between two and three inches long, and one inch and a half broad in the middle, of a light green on their upper side, but very white on their under, with many prominent transverse veins running from the midrib to the border, where they are unequally serrate: the flowers are produced at the ends of the branches in large corymbs or bunches, of a white colour, much branched. It is a native of most parts of Europe, flowering in May.

There are varieties, with deeply sinuated pinnatifid leaves, as the Swedish, and with leaves not white underneath.

The third rises to the height of forty or fifty feet, with a large trunk, spreading at the top into many branches, so as to form a large head. The young branches are covered with a purplish bark, marked with white spots: the leaves are alternate, on pretty long foot-stalks, cut into many acute angles, like those of the Maple-tree; near four inches long, and three broad in the middle, having several smaller indentures towards the top; of a bright green on their upper side, but a little woolly on the under: the flowers produced in large bunches towards the end of the branches; white, and shaped like those of the Pear-tree, but smaller, and on longer peduncles; appearing in May, being succeeded by roundish compressed fruit, like common Haws, but larger; ripening in autumn, when they are of a brown colour, and if kept till soft

have an agreeable acid taste. It is a native of Denmark, &c.

There is a variety, with oblong, ovate, slightly serrate leaves on short foot-stalks.

The fourth species rises to the height of near twenty feet, with a large upright trunk, dividing into many strong, irregular, smooth branches, so as to form a large head: the leaves are large, bending backwards; about four inches long, and three and a half broad, with five or six pairs of strong nerves, becoming of a brownish red in autumn: the flowers come out from the side of the branches in large clusters; are large, making a noble show in May, and are succeeded by large pear-shaped fruit of a bright scarlet colour, which ripens in the beginning of autumn. It is a native of Virginia, &c.

The fifth has a thornless stem and branches, with lanceolate, oval, serrated, smooth leaves, green on both sides: it is supposed by Martyn to be probably a variety of the foregoing.

The sixth species has a strong stem, ten or twelve feet high; the bark of the stem rough, of the branches smooth and reddish: the leaves are lanceolate, three inches long, and one inch broad in the middle, serrate, of a lucid green, and alternate: at many of the joints are smaller leaves in clusters: thorns axillary, very strong, two inches in length: flowers axillary, in roundish clusters, generally two together; petals white, with a blush of red; and the fruit globular, of a fine red colour. It flowers in June, and is a native of North America.

The seventh species has a slender shrubby stem, about six or seven feet high, sending out many irregular branches, armed with long slender thorns: the flowers are small, proceeding from the side of the branches, sometimes single, and at other times two or three upon the same peduncle, having large leafy calyxes, succeeded by small roundish fruit. The flowers appear the beginning of June, and the fruit ripens late in the autumnal season. It is a native of North America.

There is a variety usually known by the title of Carolina Hawthorn, which has longer and whiter leaves, and larger flowers and fruit, but no thorns.

The eighth species has a strong stem, twenty feet high, with many strong irregular branches, covered with a light-coloured bark; the leaves somewhat like those of common Hawthorn, but much larger, with broader lobes, and of a paler colour: the flowers come out in small clusters from the side of the branches, and are in shape like those of the common Hawthorn, but much larger, as well as the fruit, which, when fully ripe, has an agreeable acid taste. It is a native of the South of Europe, &c.

Culture.—All the sorts are capable of being increased with facility, by sowing the seeds in the open ground, either in the autumn or spring, in drills or broadcast, covering them to the depth of about an inch. The seeds may be gathered from the hedges in many of the sorts, and the others be procured from the nursery-men, being employed when fully ripened. The plants mostly appear in about twelve months. They should be kept perfectly clean from weeds, and be occasionally watered when the weather is hot and dry. When they have had one or two years growth in the seed-beds, they may in most of the sorts be removed into nursery-rows, and set out at the distances of from eight inches to two feet, according to the sorts, and from six inches to a foot in the rows; to remain till wanted for the purpose of forming hedges, or planting out in other places, having the top shoots and other parts cut and pruned, as there may be occasion.

The more curious sorts are generally proper for the purpose of planting out, when they have attained three, four, or five feet growth.

In order to continue the varieties, recourse must be had to the practice of budding, grafting, or layering the young branches. The two first may be performed upon stocks of the common Hawthorn, as any of the sorts will take upon that sort of stock, or upon those of one another; but the former mode is the best. The operations should be performed at the usual season in the manner directed. See **BUDDING** and **GRAFTING**.

The young shoots should be laid down in the autumn, and when they have stricken good roots, which in most cases happens in twelve or eighteen months, be taken off, and planted out in nursery rows, or other places, as the above.

The cuttings of the young shoots planted in the spring in rather moist situations, will sometimes take root, and become good plants.

All the sorts are hardy, and capable of succeeding in almost any soil or situation.

The first is a highly useful plant for the purpose of forming hedges.

And all the other species and varieties may be employed as ornamental plants in the clumps and other parts of extensive shrubberies, and other plantations. Many of the sorts have likewise a very ornamental effect, when planted out singly on lawns, or other similar parts of pleasure grounds, especially when in flower, from their beautiful blossom. On this account they have also a fine effect in mixed plantations.

CRATÆVA, a genus containing plants of the tree exotic kind for the stove.

It belongs to the class and order *Dodecandria*

Monogynia, and ranks in the natural order of *Putamineæ*.

The characters are: that the calyx is a one-leaved perianth, four-cleft, deciduous, flat at the base: divisions spreading, ovate, unequal: the corolla has four oblong petals, bent down to the same side; claws slender, length of the calyx, inserted into the divisions: the stamina consist of sixteen or more bristle-form filaments, declining to the side opposite to the petals, shorter than the corolla: anthers erect, oblong: the pistillum is a germ on a very long filiform pedicel, ovate: style none: stigma sessile, headed: the pericarpium is a fleshy, globose berry, very large, pedicelled, one-celled, two-valved: the seeds many, roundish, emarginate, and nestling.

The species cultivated are: 1. *C. tapia*, Smooth Crateva, or Garlic-Pear. 2. *C. marmelos*, Prickly Crateva.

The first is a tree which has a very large trunk, that in its natural situation rises to the height of thirty feet or more, covered with a dark green bark, sending out many branches, forming a large head. The branches are garnished with trifoliate leaves, standing on pretty long foot-stalks; the middle leaf, which is much larger than either of the others, is oval, about five inches long, and about two and a half broad in the middle. The two side leaves are oblique, the sides joining, the middle leaf being much narrower than the other, turning at both ends towards the middle, their midrib not being parallel to the sides; these two end in acute points. They are all smooth, of a light green on the upper side, but pale on the under, with entire edges. The flowers are produced at the ends of the branches, standing upon long peduncles: the fruit is about the size of an Orange, having a hard brown shell, inclosing a mealy pulp. It has a strong smell of Garlic; and is a native of the West Indies.

The second grows to a great height, with a large trunk, sending out many long branches, garnished with trifoliate leaves; the leaflets are oblong, entire, and end in acute points; between these, the branches are armed with long sharp thorns, which come out by pairs, and spread asunder: the flowers are produced in small clusters from the side of the branches, five or seven standing upon a common branching peduncle; these have each five acute petals, which are reflex; they are green on the outside, whitish within, and have a grateful odour. After the flower, the germen swells to the size of an Orange, having a hard shell, which incloses a fleshy viscous pulp, of a yellowish colour, which has an agreeable flavour when ripe. It is a native of India.

Culture.—These plants may be increased by sowing the seeds obtained from the places of their native growth, as soon as they are procured, in pots of light rich earth, plunging them in the bark-bed of the stove. When the plants have obtained about three inches growth, they should be removed into separate pots, a little water being given at the time, replunging them in the hot-bed. They require to be kept constantly in this situation, and to have the management of other plants of the tender woody exotic kind that are of similar growth.

They may be made use of for the purpose of variety among other stove plants.

CREPIS, a genus comprising plants of the herbaceous ornamental annual kind. Bastard Hawk-weed.

It belongs to the class and order *Syngenesia Polygamia Equalis*, and ranks in the natural order of *Compositae Semifusculosae*.

The characters are: that the calyx is common double: exterior, very short, spreading, deciduous: interior ovate, simple, furrowed, permanent: scales linear, converging: the corolla is compound imbricate, uniform: corollets hermaphrodite, very many, equal: proper one-petalled; ligulate, linear, truncate, five-toothed: the stamina consist of five capillary filaments, very short: anther cylindric, tubular: the pistillum a somewhat ovate germ: style filiform, length of the stamens: stigmas two, reflex: there is no pericarpium: calyx roundish: the seed solitary, oblong, fusiform, sometimes columnar: down hairy, generally stipitate: the receptacle naked, with cells or pits.

The species cultivated are: 1. *C. barbata*, Spanish Bearded Crepis, or Purple-eyed Succory Hawk-weed; 2. *C. rubra*, Purple Crepis.

The first is an annual plant, putting out leaves next the root, nine inches in length, and almost two broad in the middle, of a light green colour: the stems are a foot and half high, dividing into many branches, having leaves of the same form with the others, but smaller and sessile: the flowers are produced at the ends of the branches, and of a yellow colour, with a purplish base. It flowers in June; and is a native of the South of Europe.

There are varieties, with deep yellow flowers, and with sulphur-coloured flowers inclining to white, each having a dark purple base.

The second species has also an annual root; the root-leaves many, lanceolate, and deeply jagged. From these the stalks arise, which are a foot and half high, dividing into many slender branches, each terminated by one large flower of a red colour. It is a native of Italy.

Culture.—These, like other annuals of the

hardy kind, must be raised by sowing the seeds in either the autumn or spring; or at both periods, where they are required to flower for a great length of time, in patches, in the clumps, borders, or other parts, where they are to remain, six or seven in each, covering them in lightly. When the plants have attained six or seven inches in growth, they should be thinned out to three or four in each patch, and be kept free from weeds.

They succeed in most soils and situations, having a pleasing effect in their flowers, in the fronts and other parts of the borders and clumps of ornamented grounds.

CRESCENTIA, a genus comprehending a plant of the exotic tree kind. Calabash-Tree.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Putamineae*.

The characters are: that the calyx is a one-leaved perianth, two-parted, short, deciduous: divisions roundish, concave, obtuse, equal: the corolla is one-petalled, unequal: tube gibbous, crooked, torulose: border erect, five-cleft; divisions unequal tooth-sinuated: the stamina consist of four subulate filaments, length of the corolla, spreading; of which two are a little shorter: anthers incumbent, obtuse, twin: the pistillum is a pedicelled, ovate germ: style filiform, length of the corolla: stigma headed: the pericarpium is an oval berry, hard, one-celled: the seeds very many, sub-cordate, nestling, two-celled.

The species cultivated is: 1. *C. Cujeta*, Narrow-leaved Calabash-Tree.

It is a tree that in its native situation grows to the height of about twenty feet. It divides at top into very long, thick, scarcely subdivided branches, stretching out almost horizontally, adorned with leaves disposed in bundles or tufts scatteringly at irregular distances. These are uncertain in their number from the same knot or tubercle; oblong, attenuated at the base, on very short petioles, bright green, four or five inches long: the flower large, sometimes entirely green, but often differently variegated with purple, red, and yellow, not withering, but becoming putrid. The form of the fruit varies on different trees, being spherical, spheroidal, or shaped like a bottle; and also in size from two inches to a foot in diameter. It is a native of Jamaica.

The Broad-leaved species may likewise be cultivated.

Culture.—This species and variety are capable of being increased by sowing the seeds, procured from the places of their native growth, as soon as they are obtained, in pots of light fresh rich earth, plunging them in a bark-hot-

bed. When the plants have attained two or three inches in growth, they should be removed into separate pots of a small size, replunging them in the hot-bed. They should be kept in the hot-bed of the stove, and have the management of other tender plants of similar growth.

In this climate these plants have only a shrubby growth; but in their native situations they become large trees, producing fruit.

They are chiefly introduced for the purpose of variety among stove plants.

CRESS, GARDEN. See *LEPIDIUM*.

CRINUM, a genus affording plants of the flower, tuberous, and bulbous-rooted perennial kinds for the stove. *Asphodel Lily*.

It belongs to the class and order of *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx has the involucre spathe-form, two-leaved, oblong, umbelluliferous, after gaping reflected: the corolla one-petalled, funnel-form; tube oblong, cylindric, inflexed: border six-parted: divisions lanceolate-linear, obtuse, concave, reflected, of which the three alternate ones are distinguished by a hooked appendice: the stamina consist of six subulate filaments, from the base of the border, of the length of the border, converging: anthers oblong, linear, rising upwards, incumbent: the pistillum is an inferior germ: style filiform, length of the flower: stigma three-cleft, very small: (simple or three-cleft:) the pericarpium is a subovate capsule, three-celled: (covered with the calyx:) the seeds several.

The species cultivated are: 1. *C. Asiaticum*, Keel-leaved Asiatic Crinum; 2. *C. Americanum*, Great American Crinum; 3. *C. erulescens*, Small American Crinum.

The first has a solid turbinate root, surrounded with long branching fibres: the stem is short, thick coated, white, single: the leaves are three feet long, three inches wide, subulate-linear, erect, striated, thick and imbricate: scapes axillary, round, equal to the leaves: the flowers are white, large, in a simple flat umbel. It is a native of Malabar.

The second species has the flowering stem a foot and half in height, the thickness of a finger, slightly compressed, coming out, not from the centre of the leaves, but on one side: the leaves are two feet and more in length, and a hand broad, furrowed on the upper surface, and keeled on the lower, smooth, stiff, light green, slightly waved on the edge, thickish, sharp-pointed, pierced with many largish pores: the flowers before they open are pale yellow, but when open of a milky whiteness, and not disagreeable in smell. It is a native of South America; flowering in July and August.

In the third the flower-stem rises immediately from the root, on the outside of the leaves, and is about two feet high; on the top are eight or ten flowers, in form of an umbel, closely joined at their base, but spreading above. They are of a beautiful white colour, and smell very sweet. After the flowers are past, the germ swells, and becomes an oblong bulb. The plants generally flower three or four times in a year, but at no regular season; as the petals are of a very tender texture, they do not continue in beauty longer than four or five days. It is a native of the Spanish West Indies.

Culture.—All these sorts are capable of being increased, by planting the off-sets of their roots, in pots filled with good fresh earth, plunging them in the bark-bed of the stove; where they should be continued until they begin to show flowers. After this they may be removed when necessary, to the shelves or other parts of the hot-house.

The roots of all the different sorts should be shifted every two years, at the period when the stems decay, in order to separate the off-sets for the purpose of increase, and to refresh the plants with fresh mould.

Their succulent stalks and beautiful flowers afford a good effect among other stove plants.

CRITHMUM, a genus affording a plant of the hardy herbaceous succulent perennial esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel manifold, hemispheric; partial similar: involucre universal many-leaved: leaflets lanceolate, obtuse, reflex; partial lanceolate-linear, length of the umbellule: perianth proper scarce observable: the corolla universal uniform: florets all fertile: proper petals five, ovate, inflex, equal: the stamina have five simple filaments, longer than the corolla: anthers roundish: the pistillum is an inferior germ: styles two, reflex: stigmas obtuse: there is no pericarpium: fruit oval, compressed, bipartite: the seeds two, elliptic, compressed-flat, striated on one side.

The species cultivated is *C. maritimum*, Sea or Rock Sampire.

It has a root composed of many strong fibres, which penetrate deep into the crevices of the rocks, sending up several fleshy succulent stalks, which rise about two feet high, with winged leaves, composed of three or five divisions, each of which has three or five thick, succulent leaflets, near half an inch long; the foot-stalks of the leaves embrace the stalks at their base: the flowers are produced in circular umbels at the top of the stalks; are of a yellow colour, and succeed-

ed by seeds somewhat like those of Fennel, but larger. It is used as pickle, and much esteemed for its agreeable flavour. It is a native of the rocky shores of Europe.

Culture.—This plant, from its being a native of the sea-coasts, is raised in the garden with some difficulty. In order to its successful culture, it should have a rather moist, sandy, or gravelly situation, and be duly supplied with moisture.

It may be propagated, either by sowing the seeds in the places where the plants are to remain, in the early spring months, to the depth of about half an inch, or by parting the roots, and planting them out where they are to remain, in the beginning of autumn.

When the plants have been introduced in either of these methods, they will continue for a number of years.

The leaves constitute an admirable pickle, and are sometimes used in sallads, as well as for other culinary purposes.

CROCUS, a genus comprehending plants of the low-flowering ornamental bulbous-rooted perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensatae*.

The characters are: that the calyx is a one-leaved spathe: the corolla a simple, long tube: border six-parted, erect: divisions ovate-oblong, equal: the stamina consist of three subulate filaments, shorter than the corolla: anthers sagittate: the pistillum is an inferior, roundish germ: style filiform, length of the stamens: stigmas three, convolute, serrate: the pericarpium is a roundish capsule, three-lobed, three-celled, three-valved: the seeds several, and round: the corollets six-parted, equal: stigmas convolute.

The species are: 1. *C. officinalis*, Autumnal or Common Officinal Crocus; 2. *C. vernus*, Spring Crocus.

The first has a roundish bulbous root, as large as a small Nutmeg, a little compressed at the bottom, and covered with a coarse, brown, netted skin; from the bottom of the bulb many long fibres are sent out, which strike pretty deep into the ground; the flowers come out at the upper part of the root, which, with the young leaves, whose tops just appear, are closely wrapped about by a thin spatha or sheath, which parts within the ground, and opens on one side: the tube of the flower is very long, arising immediately from the bulb, without any foot-stalk, and at the top is divided into six ovate obtuse segments, which are equal, and of a purple blue colour. In the bottom of the tube is situated a roundish germ, supporting a slender style, which

is not more than half the length of the petal, crowned with three oblong golden stigmas, spreading asunder each way, which is the Saffron. It flowers in October, and the leaves continue growing all winter; but it never produces seeds in this climate. It is supposed by Martyn to be a native of Asia.

The chief varieties are: the Sweet-smelling with a smaller, and more compressed root, having a deep blue colour, but varying to a sky-blue: the Mountain, which has a flower of a paler blue colour; the Many-flowering blueish, with numerous sky-blue flowers; and the Small-flowering, having a small deep blue flower.

The second species has a pretty large compressed bulb, covered with a light brown, netted skin, from which arise four or five leaves of a purplish colour on their lower parts: from among these come out one or two flowers, sitting close between the young leaves, never rising above two inches high, and having an agreeable odour. From the centre of the tube a slender style proceeds, which is crowned by a broad flat stigma of a golden colour. After the flower is past, the germ pushes out of the ground. In the wild state, it is most commonly white, with a purple base. It is a native of Italy, &c.

The chief varieties are: the broad-leaved purple variegated, which has a flower of a deep blue colour, and striped; the broad-leaved plain purple; the broad-leaved violet-coloured, or large deep blue; the white with a purple bottom; the broad-leaved white variegated; the broad-leaved with many violet-purple flowers striped with white; the broad-leaved ash-coloured; the broad-leaved large yellow; the broad-leaved small pale yellow; the broad-leaved small yellow striped with black; the narrow-leaved small brimstone; and the narrow-leaved small white.

In modern catalogues, many other varieties of different colours are introduced, as blue and purple, yellow and white, or striped. New ones are also continually imported from Holland. The usual varieties at present in gardens are: the beautifully striped Scotch; the blue; the blue striped; the white; the yellow of several shades, larger and smaller; the yellow striped with black; the cloth of gold, &c.

Culture.—The culture in both these sorts is easily effected, by planting the bulbs or off-sets taken from the roots; the first sort in July, or the beginning of the following month, and the latter any time when the weather is open, from September to the beginning of April in the following year; but the more early it is performed, the stronger they flower; by means of a dibble or trowel, to the depth of about two inches,

the ground being previously well dug over, and left some time to settle. They may be set either in beds by themselves in rows, at the distance of eight or nine inches, and six or eight inches apart, or in patches of five or six roots in each, on the fronts of the clumps, borders, or other parts of gardens and pleasure grounds, putting them in in a varied manner, both in respect to the sorts, and the order in which they are planted.

Where the soils are tolerably dry, they may remain two or three years without being disturbed, but should then be taken up at the time the leaves decay, in order to separate the new bulbs or off-sets for further increase, as well as to new dig the ground. The larger bulbs should be separated from the small ones, and put up, each by themselves, in order to be planted at the proper season; the former in the above manner, and the latter in beds in rows six inches distant, to remain till they are of a proper size. See **BULBOUS ROOTS**.

As the bulbs increase fast, a large stock may with care soon be provided. But when this is not practised, bulbs of the different species and varieties may easily be procured from the nursery-men and seeds-men.

In the culture of these plants, great injury is frequently done by trimming off the green leaves at the time the flowers decline, in order to prevent litter; as by such means the future blow is rendered more weak and less beautiful.

Where new varieties are wanted, recourse must be had to the seed, which must be sown in the spring season, either where the plants are to remain, in a bed of light mellow earth, or in pots filled with the same sort of earth.

The first species is the plant which is cultivated in fields, and from the stigma of which the preparation known under the title of English Saffron is made.

CROTALARIA, a genus affording plants of the herbaceous and shrubby exotic kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceae*.

The characters are: that the calyx is a three-parted perianth, large, rather shorter than the corolla: the two superior divisions lanceolate, leaning on the standard; the third lanceolate, concave, supporting the keel, three-cleft: the corolla papilionaceous; standard cordate, acute, large, depressed on the sides; wings ovate, shorter by half than the standard: keel acuminate, length of the wings: the stamina consist of ten filaments, connate, rising, with a split line on the back, and gaping base: anthers simple: the pistillum is an oblong germ, reflex, hirsute: style simple, bent inwards at an angle, rising;

stigma obtuse: the pericarpium is a short legume, turgid, one-celled, two-valved, pedicelled: the seeds one or two, globose-kidney-form.

The species cultivated are: 1. *C. juncea*, Channel-stalked *Crotalaria*; 2. *C. laburnifolia*, Laburnum-leaved *Crotalaria*.

The first rises with an angular, rushy, stiff stem, from three to near four feet in height, dividing into three or four branches: the leaves are narrow-lanceolate, alternate, closely covered with soft silvery hairs, on very short petioles: the flowers are produced at the ends of the branches, in loose spikes, being succeeded by large turgid pods, containing one row of large kidney-shaped seeds. It is a native of the East-Indies.

The second species has a shrubby stem, four or five feet high, dividing into many branches, with trifoliate leaves, having three ovate acuminate lobes of a light-green colour, about two inches long, and one broad: the flowers are large, yellow, in large bunches from the sides of the branches, appearing from July to September, and making a fine appearance.

Culture.—The first of these plants may be increased, by sowing the seeds in pots of light mellow fresh mould in the spring, plunging them in the hot-bed of the stove; and, when the plants are of sufficient growth, removing them into separate pots; and the second sort, either by seeds in the above manner, or by planting cuttings of the young branches in the later spring or summer months, in pots of the same sort of earth, and plunging them in the bark-bed of the stove, giving them water frequently, and removing them, when well rooted, into separate pots.

They may be exposed to the open air during a little of the heat of summer, but at other periods require the protection of the hot-house.

They afford variety among other exotic plants.

CROTON, a genus comprehending plants of the herbaceous shrubby sort for the stove.

It belongs to the class and order *Monoecia Monadelphia*, and ranks in the natural order of *Tricoccae*.

The characters are: that the male flowers are smaller than the females: the calyx is a cylindric, five-toothed perianth: the corolla has in some five petals, scarce larger than the calyx, oblong, obtuse: nectary five glands, affixed to the receptacle, small: the stamina consist of ten or fifteen subulate filaments, connected at the base, length of the flower: anthers roundish, twain: female flowers remote from the males, on the same plant: the calyx is a many-leaved perianth: leaflets ovate, oblong, erect: the corolla, petals as in the males (in some scarce manifest): the pistillum is a roundish germ; styles three, reflex-spreading, length of the flower,

half-two-cleft; stigmas reflex, two-cleft; the pericarpium is a roundish capsule, three-lobed at the sides, three-celled, each of the cells being two-valved, the size of the calyx; frequently much larger: the seeds are solitary, ovate, and large.

The species cultivated are: 1. *C. lineare*, Willow-leaved Croton; 2. *C. glabellum*, Laurel-leaved Croton; 3. *C. sebiferum*, Poplar-leaved Croton, or Tallow-Tree.

The first rises with a shrubby stem, about six or seven feet high, sending out many side branches, which are covered with a smooth bark of a yellowish white colour, and very closely furnished with narrow stiff leaves, near three inches long, and about one-eighth of an inch broad, of a light green on their upper side, but their under of the same colour with the bark; the midrib is furrowed on the upper side, and very prominent on the lower: the upper part of the branches divide into four or five smaller, proceeding from the same joint, and nearly equal in length; between these arises a long loose spike of whitish green flowers. The whole plant has an aromatic odour when rubbed. From the colour of its leaves, it has acquired the name of *Wild Rosemary*, in Jamaica. It is a native of that island, &c. flowering in July.

The second species grows in a shrubby form, mostly to seven or eight feet in height. The leaves are smooth, oval, and entire: all the parts of the plant have a pretty agreeable smell. It is a native of the West-Indies.

The third rises with a shrubby stem: the leaflets are broader than they are long, and involute, and there are two glands at the base of the leaf: the leaves dye a very fine black. It is a native of China; flowering here in September. The leaves wither, turn to a dirty crimson colour, and fall off in autumn before the capsules. The young leaves shoot out again in March. Each capsule contains three hard black shells, the size of pepper-corns or common peas, covered entirely with a delicate snow-white substance. But it is not this, as is commonly supposed, that produces the tallow, but the oil expressed from the kernel; and this white substance must be well cleared from the shells before they are broken, as that considerably lessens the quantity of oil. For this purpose the shells should remain ten or fifteen days in water to soak, and then they may be cleared of the white substance by rubbing. The oil drops from the press like thick glutinous lamp oil, and soon hardens by cold to the consistency of common tallow, and by boiling it becomes as hard as bee's-wax.

Culture.—These plants may be increased by sowing the seeds procured from their native places in the early spring, in pots filled with mel-

low earth, plunging them in the bark hot-bed in the stove: when the plants are of sufficient growth, they should be removed into separate pots, and be replunged in a moderate hot-bed, having proper shade given. The first sort may likewise be easily raised, by cuttings planted in pots, and managed in the same manner.

And the second and third species may be raised by laying down the branches in the spring season, when seeds cannot be obtained.

They require the protection of the stove or hot-house during the winter season, and should be only watered very sparingly. In other respects, they should have the management of other tender stove exotics.

As they constantly retain their leaves, they afford a pretty effect in assemblage with other shrubby exotic plants.

CROWN IMPERIAL. See FRITILLARIA.

CUCKOLD TREE. See MIMOSA.

CUCKOW PINT. See ARUM.

CUCUMBER. See CUCUMIS.

CUCUMIS, a genus comprising plants of the tender trailing annual kind.

It belongs to the class and order *Monoecia Syngenesia*, and ranks in the natural order of *Cucurbitaceæ*.

The characters are: that in the male flowers, the calyx is a one-leaved, bell-shaped perianth, the margin terminated by five subulate teeth: the corolla is five-parted, growing to the calyx, bell-shaped: divisions ovate, veiny-wrinkled: the stamina consist of three filaments, very short, inserted into the calyx, converging, of which two are bifid at the tip: the anthers are lines creeping upwards and downwards, outwardly adnate: receptacle three-cornered, truncated, in the centre of the flower: the female flowers on the same plant with the males: calyx perianth as in the males, the superior, deciduous: corolla as in the males: stamina none: filaments three, acuminate, very small, without anthers: the pistillum is an inferior germ, large; style cylindric, very short; stigmas three, thick, gibbous, two-parted, turned outwards: the pericarpium is a pome (berry) three-celled (or four-celled); cells membranaceous, soft, separate (into two secondary ones): the seeds numerous, ovate-acute, compressed, placed in a double order.

The species cultivated are: 1. *C. sativus*, Common Cucumber; 2. *C. Melo*, Common or Musk Melon.

The first has the roots composed of many long, slender, white fibres; the stems are also long, rather slender, and very branchy at their points, either trailing on the ground, or climbing by means of claspers. The leaves are large, angular, on long erect footstalks, having prominent

nerves on the upper surface, and being very rough with bristles. In the flowers the segments of the calyx are much longer, and the corolla of a deeper yellow than in the Melon. They are male and female on the same plant, in the same or different fruits; the latter succeeded by oblong, rough fruit.

The principal varieties are: the Common rough green prickly, six or seven inches long, with a dark green skin, closely set with small prickles, and which is hardy, a plentiful bearer, but does not fruit early. The Short green prickly, three or four inches long, with a rather smooth skin, but having small black prickles; it is one of the hardiest and earliest sorts. The Long green prickly, which is from six to eight or nine inches long, thinly set with prickles, and a good bearer: there is a sub-variety with white fruit. The Early green cluster, which is shortish, early, with the flowers in clusters. The Long smooth green Turkey, with large stalks and leaves, and the fruit generally from ten to fifteen inches long, with a smooth rind without prickles. The Long smooth white Turkey, which is less watery, and of better quality. The Large smooth green Roman, with long, large fruit, quite smooth. The Long white prickly Dutch, with fruit eight or ten inches long, white, with small black prickles, which is a bad bearer, less hardy, but the fruit not so watery, and with fewer seeds.

The second species has roots composed of numerous very stout, wide-spreading fibres; the stems procumbent or trailing to a great length, and very much branched, furnished with tendrils for climbing: the leaves are palmate-sinuate, or entire, waving about the edge, and slightly toothed, with rounded corners; rough with bristles: the flowers pale yellow, lateral, and solitary. Those termed female have four large anthers, and the germ is subglobular, and covered with white hairs. "This discovery (Martyn observes) of the flowers usually called females being real hermaphrodites with fertile anthers, as they seem to be, makes it probably less necessary to carry the males to them, as practised by some gardeners, though nature having provided male flowers, it is most likely that the pollen in the anthers of the others is frequently defective." The fruit is roundish or oval, blunt, commonly furrowed longitudinally, sometimes netted, sometimes warted or carbuncled, from four to ten or twelve inches in length and diameter, yellowish green, or white; the pulp being firm, musky, reddish, seldom green. It was first introduced into Europe from Persia.

There are numerous varieties; but those most deserving of cultivation are the Cantaleupe, so called from a place near Rome, where it has been

long cultivated. Its flesh, when in perfection, is delicious, and may be eaten with safety. The outer coat is very rough, and full of knobs and protuberances, like warts; it is of a middling size, rather round than long, and the flesh, for the most part, of an orange colour. There are several sub-varieties, such as The Large black Carbuncled, or Black Rock, which is of a blackish green-colour; Large green Carbuncled, Large white Carbuncled, and the Orange.

The Romana, which is forwarder in the season than the above.

The Succado, which is also a good sort when cultivated for early fruit, but inferior to the Cantaleupe.

The Zatte is likewise a good sort, but very small, seldom bigger than a large orange; it is a little flattened at the two ends, and the outer coat is warted like the Cantaleupe.

The small Portugal, sometimes termed the Dormer Melon, is a pretty good fruit, the plants generally producing them in plenty. It may be cultivated for an early crop.

The Black Galloway, introduced from Portugal by Lord Galloway, is likewise a good sort for early cultivation, as the fruit ripens in a very short time from its first setting.

Culture.—In the raising and producing of these fruits, much care and attention is necessary, as well as a considerable degree of skill in the regulation, management, and application of the heat which is required to bring them to perfection.

Culture in the Cucumber Kind.—The method of raising these plants is by sowing the seeds annually in hot-beds covered by frames and glasses for the early production of fruit, and in the open ground for the late crops. The former mode must, however, in general be practised in some degree or other, till the season becomes perfectly warm and settled, as towards the beginning of June. Various methods of applying heat in the producing of this fruit at early and late periods have been employed and recommended; but those which have had the greatest success are dung hot-beds, bark hot-beds, steam-pans, and flued pits. It is obvious that, in whatever manner artificial heat is made use of in this intention, the great point to be attended to is that of communicating and continuing it in as regular and equal a way as possible. But there is another circumstance which deserves consideration in the business, which is, that of its being accompanied with a suitable degree of moisture. It is principally on this account that stable-dung answers more completely in the raising of this sort of fruit than tanners' bark, or the use of flued pits.

Mr. Nicol has well remarked, that the deficiency of this gentle moist heat is the reason why bark hot-beds are less useful for raising the early crops, but highly serviceable in the late ones, as they have the effect of "drying off the external damps which are then prevalent," and of course hasten the maturity of the fruit. In other cases, the plants "are impatient in a dry fire heat."

The chief objections to the employing of the steam of boiling water in the forcing of Cucumbers, are the great difficulty of keeping the heat up in a regular manner, and the vast trouble that attends it.

The principal inconveniences that have been met with in the forcing of this fruit on dung hot-beds, are the danger of injuring the plants by too much heat, and that of their being blanched by the rank steam that mostly abounds. In order to obviate these inconveniences, it has been attempted to raise these fruits on the beds of the preceding year, by means of linings of fresh dung; but, in practice, it has not only been found that such beds are equally liable to damps, but at the same time exposed to much risk and inconvenience from the frequent loss of heat in the linings.

On these accounts it is therefore probable that, until some more convenient mode of applying and keeping up a regular moist heat be discovered than has hitherto been made use of, the practice of procuring this sort of fruit on fresh made dung hot-beds must be had recourse to as the best and most certain method for the early crops.

In the cultivating of Cucumbers in this way, the principal apparatus and materials which are necessary in carrying it to any considerable extent, are a sufficient number of frames, or pits of different sizes, with glass lights for covering them, so as to prevent the entrance of water and air. And it is usual, where this culture is much attended to and practised in the most perfect manner, to have a one-light frame for the seed-bed, a two-light one for pricking out the young plants and nursing them in, and two or more two-light frames for their fruiting in; but they may be cultivated very well, on a small scale, with one or two small frames. See FORCING FRAMES.

For the constructing of the hot-beds, the principal material is fresh horse-dung in neither too long or short a condition; but proper for taking on the process of fermentation. It should be had in the proportion of about one cart-load to each light, and be prepared for the purpose by being well shaken together into a heap, ten days or a fortnight before it is made use of, as by this

means a regular heat will be brought on, and the rank heat and steam, as well as the disagreeable smell be removed. Some, in order to promote these, and render the preparation more perfect, have the whole turned over once or twice. Care, however, should be taken, that the reduction of the dung be not carried too far before it is put in the bed, as where that is the case too little heat will afterwards be produced.

Where this sort of material is scarce, and there is bark at hand, beds for the purpose may be made with it, having only dung for the outside; but care must be taken that they be so covered as that the roots of the plants never reach the bark, as it cankers and destroys them.

In the making of beds for this sort of culture, some, where proper forcing grounds are not provided, with the view of neatness, sink the foundations of them; but this should never be practised, except where the soil is very dry and gravelly, as the stagnation of moisture is very prejudicial in the bottoms of such beds. If the soil be of a moist retentive nature, it will be highly beneficial to have the bottoms raised to some height above the surface of the natural ground. Besides, where they are not sunk, the heat from above, the linings is more beneficially applied.

When proper forcing grounds are not made use of for the culture of these plants, open, dry, warm sheltered situations which decline to, or have southern aspects should be chosen.

The mould for covering the beds with should be of a light good rich quality, prepared by being thrown into a heap for several months before it is employed. Mr. Nicol advises three-fourths of the richest black loam that can be procured from a pasture, and one-fourth of vegetable mould from decayed tree-leaves, mixed and incorporated well with a due proportion of good stable-dung, as the best for this purpose. The rotten dung of old hot-beds is, however, most commonly employed with such earthy substances as the above.

The mould made use of for the more early crops should be laid up in some open place, where it may be kept in a rather dry condition, to render it more fit for the purpose.

And when it is to be made use of, it should not be rendered fine by sifting, as when made too fine it is apt to lie too close and compact, and by that means not only prevent the roots of the plants from perfectly establishing themselves, but confine the heat too much, and endanger the plants in that way.

Some small pots will be wanted where this sort of culture is attempted at an early period, both for the purpose of sowing the seed in,

and that of pricking the young plants out, that they may be removed and transplanted with greater ease and convenience, and with less danger of being injured in their growth. It is usual for each pot to contain two or three plants, which are sufficient for a one-light frame. Pots of the sizes denominated thirty-two's and forty-eight's are commonly made use of.

In addition to these requisites, bass mats are necessary to cover the glasses in the nights with, and when the weather is bad. Straw and other similar substances may be employed for the same use, but they are much less convenient.

The periods of sowing and beginning the works of forcing, in order to have this sort of fruit in the early season, must vary according as it is wanted; but for the very early crops, as those to be cut in the end of December and the following month, and in February, March, and April,—it should for the former be done towards the end of October and beginning of the following month, and for the latter in December, January, and the beginning of February. But for later crops, to come in in June and the following month, it should be in April and May. Still later crops are often produced on ridges in the open ground without artificial heat.

The general practice is, however, chiefly to have only three crops, the first in March or April, on hot-beds under glasses; the second in May and June, under hand-glasses; and the last on ridges, as mentioned before.

In order to have the crops come in regularly, an exact attention should be paid to the periods of putting in the seed and beginning the work of forcing.

In the choice of seed for the different crops, the early short and long prickly sorts are mostly made use of for the early crops, but the latter for the general ones, and those of the other larger kinds for the later crops. The seed should be taken from the earliest fruit, at the first or second joints, and be perfectly well-ripened. And, in order to prevent its running too luxuriantly into vine, it should be kept two years or more before it is made use of, or, when employed while fresh, be kept some weeks or months in a dry warm situation, as by this means the plants fruit better.

Forming the Beds and raising the Plants.—In the early culture of this vegetable, it is mostly the practice, where there are sufficient conveniences and plenty of dung or other materials, to have recourse to two or more hot-beds under frames; as a small one for sowing the seeds on, and a large one for growing the plants upon; or sometimes the second is made of a more moderate size, and used for nursing the plants

in, previous to their being set or ridged out in the large one for fruiting.

But by making the beds of a good size and in a substantial manner, with due attention to linings, they may be grown very well on one or two hot-beds. When cultivated on a small scale, seldom more than one is employed.

In forming the beds, attention must be had to the size of the frames, and to making them considerably larger than the boxes. Some advise only a few inches; but Mr. Nicol thinks they should extend beyond the frames at least eighteen inches all round.

In building the beds, the dung, prepared as mentioned above, should be used in the following manner, beginning with the most littersy part, and afterwards that which is more reduced. The different parts should be well mixed together, and beaten down with the fork, or trodden equally in, where very littersy, once or twice as the work proceeds, till they are made up to the full height of five feet in the back and four in the front of the frame. Some suppose two feet and a half or three feet to be sufficient when the beds are merely intended for just raising the plants; but the former practice is probably always the best where plenty of materials can be easily procured. When thus prepared, it is the custom of some to let them remain with the frames and glasses upon them for a few days, that the rank heat may be brought up, and when it begins to go off—to cover them over with mould prepared in the manner already described, to the depth of five or six inches, sowing the seed in little drills half an inch deep when the mould is a little warmed. Others cover them almost immediately with dry earth, tan, or other similar material, to the depth of five or six inches, sowing the seeds in small pots filled with mould, plunging them previously for a little time in the beds, cautiously guarding against too much heat at first, by drawing up the pots when necessary.

The author of the Scotch Forcing Gardener, however, directs, that when the beds have been made to the height mentioned above, they should be turfed over in a careful manner, as in forcing Asparagus, and the frames then placed upon them, laying dry fine sea- or pit-sand in a sloping direction, according to the frames, over the whole, to within six inches of the lights, and above that two inches in thickness of light sandy loam. The seeds should then be sown in small garden pots or pans filled with entire vegetable mould from decayed tree-leaves, and covered to the depth of half an inch, plunging them to the brims in the centres of the beds endways, and a foot from the backs. The glasses should then be placed over them.

In the course of twenty-four hours the beds will in general take on heat, when a little air should be constantly admitted, by tilting the backs of the lights an inch or more in height, and the fronts about half that height, except when there is frost, in order to discharge any rank heat or vapour that may be produced.

The frames should be carefully matted up every night when the sun begins to decline, and be uncovered again before eight o'clock in the morning, when the season will permit: as perfect a regard should be had to this, as those of air and water.

Mr. Nicol says, that "a little kindly steam in the morning is a good symptom, but it ought never to be encouraged to any great extent." He never wishes to see more steam in the beds at this time of the day, than what is entirely dispelled in the first hour after the frames are uncovered.

The bottoms of the pots or pans should be occasionally continued to be examined, to see that the heat is not too violent, raising and watering them with water brought to a proper temperature in the beds when necessary.

When the plants have attained about two inches' growth, they should be pricked out into other small pots filled with the same sort of mould, three or four in each, putting them as far distant in each as possible, the mould being settled to their roots by a little water, replunging them in the beds to their brims, the surfaces of which being previously wrought over to the full depth of the sandy covering, and another stratum of sandy loam applied as before. They should be carefully nursed in these situations, by due attention to the admission of air, the giving of water, and the regulation of steam, continuing occasionally the examination of the bottoms of the pots, to guard against too much heat being applied to the roots of the plants.

While the plants are thus carefully brought forward to the proper state for being set or ridged out in the fruiting hot-beds, which is the case when they have acquired a vigorous growth, and put forth three or four *rough* leaves, some stable-dung, in proportion to the extent of the frames, should be got ready in the manner directed above for forming the fruiting-beds, which should be made up in the same way as the former. The frames and lights should then be placed over the beds in order to bring up the heat and protect them from being injured by wet. And when the heat has become moderate, which will require time in proportion to the extent of the framing, the beds should be earthed or moulded over, the surfaces of them being previously rendered even. In per-

forming this business, the earth should be applied in such a manner as to form a sort of hillock in the middle of each light, within about a foot or eighteen inches from the backs of the frames, the whole of the other parts being covered equally to the depth of two, three, or more inches. The author of the Scotch Forcing Gardener, however, directs, that, when the dung is suspected of heating to too great a degree, the beds should be turfed all over as mentioned above; but where this is not the case, a large round turf placed in the middle of each light, exactly under the parts where the plants are to be placed, may be sufficient; the surface of the dung in this case being previously covered over to the depth of six inches with light sand or well rotted old tan, which should be first made perfectly dry.

Whichever practice is made use of, the beds will in general be in a proper state for putting the plants in, in about twenty-four hours; but before this is done the mould or earth should be drawn up, so as to raise the hillocks to within five or six inches of the glasses, exactly over the turfs, leaving them ten inches or a foot in breadth at the tops.

In the planting or ridging out the plants, a hole should be formed in each hillock, sufficiently large for the complete reception of the plants with the entire balls of earth about their roots, up to the level of the surfaces of the hills, covering them over with a little mould; the whole being then settled with a little water previously brought to the proper state of warmth, and the glasses put on.

Some, in order to promote the adhesion of the mould about the roots of the plants, have recourse to watering the pots before they are turned out.

When the plants have been thus ridged or set out, they should be carefully attended to in respect to air, water, covering in the nights and bad weather, the state of heat of the beds, linings, the occasionally moulding the spaces between the hills, and the stopping and training the plants.

In regulating the first, the state of the season and the beds should be fully considered, and air admitted accordingly, by raising the back part of the lights. The waterings should be cautiously given in the winter and early spring, but more freely as the warmth of the weather advances, shutting down the frames for some time after each application. In the more early crops much less water will be requisite than in those in which the season is more advanced, and the former will stand in need of much less frequent waterings over head than those of the latter. In these latter, shade is likewise occasionally neces-

sary when the weather is sunny. The glasses should be carefully covered up with mats every evening before the influence of the sun is wholly gone, and when the weather is very severe, more than one mat may often be found necessary. These should constantly be removed the first thing in the morning, or as soon as the sun is upon the frames, when the state of the weather will admit; but in very severe weather not removed at all.

The heat of the beds is likewise to be particularly regarded at first, by a frequent examination of the trying-sticks, and regulated in such a manner as to promote the healthy growth of the plants. When it continues too great, it should be let off by making holes in the sides of the beds, and the use of fresh earth on the surfaces.

When the heat of the beds begins obviously to decline, recourse must immediately be had to the application of linings of fresh dung round them, so as to keep up a due degree of heat, care being constantly taken to repeat them as frequently as may be necessary, and at the same time to guard against the prejudicial effects of too great heat.

These linings, Mr. Nicol advises, to be covered by turf or mould, and to have the sides and ends of the beds cut off and formed into them.

The earthing the beds between the hillocks should be gradually performed, as soon as the heat is become perfectly moderate, the mould for the purpose being previously laid in some part of the frame: Mr. Nicol considers fifteen inches as a good medium for the earth above the sand or tan, and thinks the business should be done either a few days before or after the application of the linings.

The business of pruning or stopping is by some begun while the plants are in the nursery-beds, but others defer it till after the plants are ridged out in the fruiting-beds.

Mr. Nicol does not think it at all material to pick out the heart-buds as soon as the plants have formed their rough leaves; as from the most accurate trials, and the most minute observation, he is convinced "it is of no manner of consequence, whether the buds are picked out or not." He "seldom thinks of picking or pinching till the plants begin to put forth runners or vines, nor even then, unless they happen to put forth too few to furnish their sides of the frames, till he perceives the rudiments of the fruit."

It is then, he supposes, time to stop those vines which have fruit *shown*; but the others may be suffered to run to the length of six or eight joints, and be then stopped, to cause them to put out

fertile ones, which they seldom fail to do when the plants are in a healthy state of growth.

Where an extraordinary quantity of male blossoms appears, it is recommended that part of them be rubbed off in a gentle manner with the finger and thumb, as the knife should never be made use of, unless in cutting out old vines; but this should never be attempted where there is not a very full blow, as it is proper to assist nature without either spurring or thwarting her.

When the female blossoms are in a state of sufficient forwardness, they may be carefully impregnated with the strongest and most healthy of the males, by which the swelling of the fruit may be greatly promoted; for though the fruit may be formed, swell to a tolerable size, and be fit for the table without, it will not ripen its seed. And though the farina of the male blossoms may often be deposited on the females by means of the wind and insects, it is the safest mode, in the early culture of these plants, to have it performed by the hand, as handsome set fruit may be set apart for seed with more certainty. In the execution of this work, which some suppose the most properly performed the day or day-after the flowers of both sorts are fully open, the best way is to gather the male blossom with a short stem, removing the petal or corolla carefully from about the stamina and antheræ, and then take the stalk of the blossom betwixt the finger and thumb, and apply the top of the stamina to the centre of the three stigmas of the female blossom, and, by giving it a slight twirl, discharge a portion of the farina into the stigmata of the female; making use of a fresh male blossom for each impregnation.

After this the plants begin to grow vigorously, and produce large quantities of fruit. Great care should therefore be taken to keep the vines in due order, and not too thick or crossing one another; all the withered and decayed leaves being removed, as well as the others when too numerous.

Air should now be admitted more freely, in increasing the proportion daily as the season advances. More large and repeated waterings should likewise be given from the rose of the pot, and the advantage of warm showers may be taken as the weather becomes more warm. Few plants require more of this fluid than these at this period of their growth. When the season becomes fine in May, the glasses may be wholly removed during the day-time. About the middle of the following month, a lining, when necessary, may be applied to the fronts of the frames in the same way as advised for the other parts,

which will continue a due degree of heat as long as it will be requisite to attend to the state of the bottom heat in the beds.

In the early culture of the Cucumber, it is a good practice never to depend for raising the plants upon the first sowing; but to continue sowing occasionally, both in the nursery and fruiting hot-beds, in pots, managing the plants in the same way as those in the seed-bed, as by this means plants of different growths will be constantly at hand, for the supplying of accidents as well as for succession crops.

Culture under Hand or other Glasses.—In this method the seed should be sown towards the latter end of March or beginning of the following month, on an old hot-bed, having the plants in a proper state for being set or ridged out about the beginning of May, which is sufficiently early for their succeeding well in this mode of culture. The most proper sort of seed for this purpose is that of the Long prickly green.

The beds for this purpose should be prepared of hot dung, in the manner directed for the early crops; being made from two to three feet in thickness, and about three in width, along the ground, in a straight line, having the distance of from three to four feet from each other. The most usual method is to form them in long trenches, or in holes a foot and half in depth; but they may be made on the level surface where this mode is attempted at an early period. In either method the beds should then be earthed over, raising the mould into little hillocks for the reception of the plants, the hand-glasses being immediately placed over them; and in the course of a day or two the earth will be in a suitable condition for receiving the plants. These should be put in in the middle of the hills, three or four in each, with balls of earth about their roots, in the same manner as practised in the other crops, a little water being given at the time and the glasses put on, proper shade being had recourse to when necessary.

Air and water should also be afforded in due proportion, according to the state of the weather and the heat of the beds, keeping the glasses well covered with mats in the nights and when the season is severe.

When the heat in these beds begins to decline, more earth should be applied between the hills of plants, and some fresh dung externally, by way of linings, to preserve and keep up the heat as much as possible when the weather continues cold. And as the warmth of the season advances, air and water should be given more freely.

When the glasses have become pretty full with

the plants, they should be raised a little; that the runners may extend themselves without, and be properly trained and pegged down, continuing to attend them carefully in respect to covering in the nights, air and water, the last being frequently applied all over the beds.

In this mode Cucumbers may be provided from about the latter end of May till the beginning of September.

Culture on Ridges in the open Ground.—For this purpose a warm sheltered situation which is open to the South, and where the soil is good and rich, should be fixed upon, the land being well dug into a trench, and a suitable proportion of dung covered in, the surface being formed into a sort of ridge or bank, sloping towards the South. Some, however, divide the ground, after being neatly dug over, into beds five or six feet in width, with alleys of a foot or foot and half between them.

In either method the seed should be put in as soon as the beds are ready; in the former, towards the back parts, and in the latter along the middle, to the depth of about half an inch, six or seven seeds in a place, an inch or two apart, slight sprinklings of water being occasionally given afterwards.

The proper season for performing these sowings is about the end of May or first part of June, according to the state of the weather.

The principal culture which is necessary during the growth of these crops, is that of keeping the vines perfectly free from all sorts of weeds, thinning the plants to proper distances, directing the runners in a regular manner along the surface, and keeping them properly watered according to the state of the season.

These crops chiefly come in about the middle of August, and are principally employed as picklers, for which purpose the beds should be carefully looked over two or three times every week, on dry days, and all such collected as are in a proper state, as about one or two inches in length, and the thickness of the finger.

When the weather proves wet, they should be guarded as much as possible from it, as under such circumstances they are very apt to become spotted.

In the saving of Cucumber seed, some of the best and most early of the general frame crops should be reserved till perfectly ripened; when they must be separated from the vine, and be laid in a proper place to dry; the seeds being then separated from the pulp, and rendered more perfectly dry, when they may be put up for use, for which they are, as has been seen, in the most proper condition after they have been kept two or three years.

The chief insect that infests crops of this sort is the aphid, which is readily destroyed by fumigating with tobacco, or in the manner advised for the Peach. See *AMYGDALUS*.

Culture in the Melon Kind.—In the raising of this sort of fruit, the same apparatus is necessary as in the culture of the Cucumber; but it is better if the frames or pits have rather more depth, and are somewhat larger in other respects.

The beds, for the early crops especially, should be prepared in the same manner, and with materials of the same kind; but the later ones may be produced in hot-beds formed of tanners' bark, either wholly, or in a great part.

Mr. Nicol thinks that they should be turfed all over in a rather stronger manner, and covered with a compost, consisting of one half of strong brown loam, a quarter light black loam, an eighth vegetable mould, and the same quantity of stable-dung.

The proper season for sowing the seed for the very early crops is about the middle of January; but the beginning of February is probably a better period; and sowings should be made twice in March for succession crops. These different sowings should be made on hot-beds, or in pots of light mould plunged in hot-beds prepared for the purpose, as in the Cucumber; or the pots may be placed in such old hot-beds of that sort as are at work, the same care and management being employed in the raising and nursing as in those of the Cucumber kind.

When the plants have attained five or six weeks' growth, or have two or three rough leaves, and are beginning to send forth runners, they are in a proper state for being planted or ridged out in the fruiting-beds, which should be prepared in the same manner as in those for the Cucumber plants: and after being well moulded over, the pots of plants put in with the full balls of earth about their roots, exactly in the same way as was practised for Cucumbers, immediately placing the glasses over them.

After this the plants should have air admitted pretty freely, and be kept in a moderate state of moisture till they begin to show fruit, great care being taken that the heat is not too great, and to keep the beds as free of steam as possible; but from that period, until the fruit is fully set and has begun to swell, the waterings should be more sparing, especially when the season is moist.

As the heat in the beds begins to decline, it should be refreshed by the application of linings, in the same manner as practised for Cucumbers; and the spaces between the hills of plants must be gradually filled up with mould to nearly the same height.

As the runners proceed in their growth, they should be trained in a regular manner; and when they have three joints, length they must be stopped. Some, however, stop them before, when they first begin to put forth runners. By these stoppings the vines are induced to throw out lateral runners which afford fruit. Mr. Nicol directs, that the vines that have fruit on them should be shortened at the second joint above it, and that such as have none should be trained regularly to the length of seven or eight joints and then stopped, to induce them to put forth new vines, which mostly show fruit at the second or third joint. It is of much importance in this state of the plants to keep up a due degree of heat, as they not only set much better and more plentifully where it is the case, but continue their growth in a more perfect manner. The young fruit mostly shows itself with numerous male blossoms: these should not be picked off as is sometimes the practice, as their farina is necessary for fecundating the female flowers, which in the early crops may be performed in the manner directed for the Cucumber. While the fruit is setting, air should always be pretty freely admitted when the weather is suitable.

When the fruit is perfectly set, water should be given in larger proportions till it has done swelling and begins to become ripe, when it should be very sparingly employed; as where given in too great abundance, the flavour of the fruit is not only much impaired, but it is often burst, and rendered less valuable.

As the Melons increase in size, pieces of slate or tile should be placed under each of them, as it not only prevents their being injured by the damp, but prevents their acquiring an earthy flavour. It is the practice with some to cover the whole surface with tiles or some strawey or other similar substance, but this is not by any means judicious, as the first causes too much heat by the reflection that is produced, and the latter not only confines the moisture, but has a tendency to generate and harbour noxious insects.

In the management of the vines as the fruit approaches to the state of maturity, they should not be suffered to retain too many leaves, nor these permitted to shade it from the influence of the sun. It is necessary to look over and examine them frequently, but never to prune them too greatly at one time, as where that is done the plants are apt to sustain much injury by bleeding too much. Fresh air should be continued to be admitted freely whenever the state of the weather will allow.

This sort of fruit generally becomes ripe in

the course of six or seven weeks from the time of its setting, and should be cut as soon as ever it has obtained that state, as when delayed much of the fineness of flavour is lost. The signs of maturity are a sort of cracking at the base about the stem, having a fine yellow colour, and affording a fine fragrant smell, with a degree of softness about the top. It should be cut with a portion of the stem, and laid in a dry airy situation till wanted for use.

The author of the Scotch Forcing Gardener observes, that many of the early sown kinds are capable of "producing a second crop, equal both in quantity and quality to the first." With this intention he advises, that after the first crop has been cut, the vines be "shortened back to the last live joint on each; the beds being well watered, and protected from the effects of the mid-day sun for eight or ten days, at which time the plants will begin to push forth afresh, and show fruit in plenty."

Culture under Hand or other Glasses.—It is sometimes the practice to raise Melon crops on ridges under hand, or other sorts of glasses, especially when the season is fine.

The ridges in this case must be formed with good prepared stable-dung, in the same manner as practised in forming those for Cucumbers; and also moulded or earthed into small hillocks in the same way, only rather more earth should be employed in these cases.

The plants may be raised in the seed or other beds, and be carefully nursed in a similar method, till they are in a proper state of growth to be set out, which in this sort of culture should not be done till towards the middle or latter end of May, according to the state of the season.

The pots of plants should be set or ridged out, one on each hillock, in the same mode as those of the Cucumber kind; shade and a slight watering being given at the time, and the glasses immediately put on.

After being thus planted out, the same care and management are necessary as in the other crops, in respect to air, water, covering in the nights and bad weather, training and stopping the plants, as well as in moulding up the spaces between the hills, and the application of linings when required. When the vines begin to fill the glasses, they should be trained on the outside of them, the glasses being raised, but still left upon the plants, protecting the vine on the outside as much as possible from wet when the season is bad.

The same directions are applicable after the setting of the fruit, till it becomes in a state for cutting, as in the frame crops.

Culture in Flued Pits.—This method, as has been already remarked, is principally made use of for raising late crops of this sort of fruit.

The plants for this purpose may be raised in hot-beds, or under hand or other glasses, till they are of a suitable growth to be planted in the pits.

It is sufficiently early to commence this sort of culture about the middle or latter end of June, as at this period but little bottom heat will be wanted; the old beds that have produced other crops may be converted to this use. The Scotch Forcing Gardener directs, that one-third new be mixed with the old tan or dung in order to renew the heat, levelling the whole to the bottom of the flues quite round. Turfing is considered as unnecessary, but mould should be applied to the thickness of about fifteen inches, so as to raise the whole surface to the height of the tops of the flues.

When the beds are thus prepared, the plants should be put in, in a line along the middle of them in the pits, at the distance of about two feet from each other, care being taken to keep their roots as much as possible from reaching the tan. See BARK-PIT.

In their after-management, the plants require the same care according to the season, both in regard to air, water, training, stopping, and impregnating, as has been directed for the crops in the frames.

Towards the latter end of August or beginning of the following month, when the heat of the beds in the pits begin to be deficient, and there is much moisture and cold, it will mostly be requisite to have recourse to the aid of fire heat, in order to fully maturate such fruit as is not already ripened. The fires should at first be slow, and only made in the evenings; but afterwards increased, as the severity of the season demands, so as that it may raise the heat of the air in the pits to about seventy degrees of Fahrenheit's thermometer in the evenings and mornings about eight o'clock. Mr. Nicol directs, that in order to admit air sufficiently, and keep up a proper degree of heat in dull hazy weather, a little fire should be made in the mornings; and that as the growth of the plants is now over, water should be made use of with much caution, being wholly discontinued as soon as the fruit has attained its full growth.

The seed employed in the culture of this sort of fruit should be such as is taken from the best plants of the most curious varieties, and which has been perfectly ripened, and preserved for one or more years in some dry place. New seed seldom answer well in cultivation.

The Acarus or Red Spider, is an insect that frequently does much injury to the Melon when the season is dry and there is a dry heat in the

beds. Its attacks are shown long before it becomes visible, according to Mr. Forsyth, by the "leaves curling and cracking in the middle."

As a remedy in this situation, he advises, when the weather is warm and sunny, the watering them all over the leaves from a watering-pot with the rose upon it, or an engine, about six o'clock in the morning, and about eight to shade them with mats, when the sun shines, shutting the frames down close till towards eleven, then to admit air in a small proportion, continuing the mats till about three in the afternoon, and then removing them. In this way the leaves are prevented from injury by the sun while wet. And when there is a south or south-west wind, the watering may be repeated about three in the afternoon, shutting up the frames, to produce a strong exhalation and destroy the insects. In the operation, as much water as possible should be thrown on the under side of the leaves, gently turning the vines for the purpose. The lights and sides of the boxes should likewise be well watered; and before the frames are made use of again they should be well washed inside and out, first with water, and then soap-suds and urine in a state of mixture. When Melons have been infested with the spider the preceding season, none of the earth or mould should be made use of again.

In sprinkling the leaves, water that has been several days exposed to the sun, or made soft by wood-ashes, should be employed.

The author of the Scotch Forcing Gardener, however, observes, that water at some periods cannot be thus applied without much injury to the plants, and that the leaves and vines are so brittle and tender that they cannot be brushed or touched without harm.

It is of course obvious, that much care and circumspection is necessary in extirpating these insects by the use of water.

CUCURBITA, a genus comprehending plants of the herbaceous trailing annual kind.

It belongs to the class and order *Monoclea Syngenesia*, and ranks in the natural order of *Cucurbitaceæ*.

The characters are: that in the male flowers the calyx is a one-leaved perianthium, bell-shaped, the margin terminated by five subulate teeth: the corolla five-parted, growing to the calyx, bell-shaped: divisions veiny-rugose: nectary a gland in the centre of the flower, concave, triangular: the stamina consist of three filaments, converging, connected above, distinct below, growing to the calyx: anthers creeping upwards and downwards, linear. In the female flowers the calyx a perianthium, as in the male, superior, deciduous: the corolla as in the male: nectarifer-

ous glandule concave, spreading: the stamina, margin surrounding, ending in three very short cusps: the pistillum is a large inferior germ: style conic, three-cleft at the tip (five-cleft): stigma single, with a thick, convex margin, creeping upwards and downwards, three-cleft: the pericarpium is a pome (berry) three-celled; (three to five) cells membranaceous, soft, distinct (two-parted): the seeds very many, compressed, swollen on the margin, obtuse, placed in double order.

The species are: 1. *C. Lagenaria*, Bottle or Long Gourd; 2. *C. Pepo*, Pompion, or Pompkin Gourd; 3. *C. verrucosa*, Warted Gourd; 4. *C. Melopepo*, Squash Gourd; 5. *C. Citrullus*, Water Melon.

The first has a trailing, thick, downy stalk, branching into many spreading runners, extending along the ground fifteen or twenty feet in length. The leaves are large, roundish, heart-shaped, indented, woolly, biglandulous at the base: the flowers large and white, being succeeded by long, incurved, whitish-yellow fruit, shaped like a bottle, with a large roundish belly and smooth neck, from about two to five or six feet in length, and from nine to eighteen inches or more round, having a ligneous, durable shell.

The chief varieties of which are: the Common long-fruited, the Long-protuberant-bellied, the Long sickle-shaped, the Long taper, and the Long turbinated Bottle-Gourd.

The second species has thick, angular stems, extremely hispid, branched, climbing by means of bifid tendrils, or spreading to the distance of forty feet. The leaves are cordate, large, roundish-angular, toothed, wrinkled, hairy on both sides, on long, alternate, thick, flexuose, hirsute petioles: the flowers are yellow, lateral, solitary, on peduncles resembling the petioles, but shorter: the fruit is roundish, ovate-globular, or oblong-ovate; of a pale green on the outside, and commonly hispid, with bristly hairs; within having a spongy insipid white pulp or flesh; divided in the middle into three primary cells, each of which is double, and these are subdivided into the proper cells of the seeds. It flowers from June to August.

There are several varieties, as the Common large round-fruited yellow, Oval yellow, Oblong yellow, Whitish-fruited, Stone-coloured, Flesh-coloured, Parti-coloured, Marbled, Small round, Orange-shaped, Pear-shaped, Turbinated, Hemispherical or Semi-globular, Egg-shaped, Striped roundish, Striped egg-shaped, Striped turbinated, and Striped pear-shaped Pompion, &c.

The third has trailing stalks, very branchy and spreading, running upon the ground as in the

above sort: the leaves large lobated, and the flowers yellow, succeeded by roundish, knobby-warted, white fruit, of a moderate size.

The varieties are: the Roundish Warted, the Oblong Warted, the Flat Warted, the Bottle-shaped Warted, the Orange-shaped Warted, the Lemon Warted, and the Yellow-fruited.

The fourth species has a roundish stem, hairy, procumbent or climbing, with trifid tendrils, with many long branches: the leaves are lobed-angular, serrate, hairy, alternate, on long petioles: the flowers yellow, on lateral, one-flowered peduncles: the fruit large, reddish-yellow or yellowish-white within and without, commonly roundish, often flattened at top and bottom, always torulose, sometimes ovate, but seldom warted. It is common in North America.

The varieties are: the Common broad flat, the Buckler-shaped, the Conical, Citron-shaped, the Flat-sided, the Turbinate, the Hemispherical, the Depressed, the Star-shaped, the White-striped, and the Yellow-striped Squash Gourd.

The fifth has a round striated stem, long, branched, hairy, procumbent, diffused with lateral bifid tendrils: the flowers are yellow, on short, solitary, lateral peduncles: the fruit large, smooth, round or oblong, a foot and half in length, within watery, sweet, very red or pale. It is a native of the South of Europe.

The varieties in the form of the fruit are: the Large round red-fleshed, the Large round white-fleshed, the Large oblong, and the Small round Water Melon.

Culture.—In the raising of most of these plants, as well as their after culture, the aid of artificial heat and shelter is generally requisite.

Culture in the Gourd Kind.—This is effected by sowing the seed annually, either on slight hot-beds or in the open ground in the spring months; but the former is probably the best mode, as the plants are more early. In the first method, it should be performed about the latter end of March or the middle of April; and when the plants have attained a pretty strong growth, and been hardened by the free admission of air, they should be removed into the situations where they are to remain in the open ground with balls of earth about their roots.

In the latter mode, the seed may be sown in the natural ground where the plants are to remain, about the middle of May, open sunny situations being provided for the purpose. The mould should be made fine, and the seed put in to the depth of about half an inch, three or four seeds in a place.

Some advise the putting in a little dung in the situations where the seeds are to be sown, in order to forward the plants; and when they

come up, to protect them by hand-glasses. This is particularly useful for the more tender kinds.

When the plants are of some growth, they should be thinned out to one or two good plants, and be plentifully supplied with water when the season is hot and dry, especially after they have begun to run or spread; as by this management they will extend very considerably.

When any of the sorts are cultivated for the purpose of ornament, they should be trained to strong stakes in order to show their flowers more fully.

The seed should be saved from the best and most perfectly ripened fruit of the different kinds, being carefully freed from the pulp, and preserved in a dry situation.

Culture in the Water Melon Kind.—The culture in these plants is by sowing the seed annually about the latter end of February or beginning of the following month, on pretty substantial hot-beds, keeping them protected by the glasses when the weather is bad: after the plants have attained a little growth, they should be pricked out into small pots, two plants in each, being replunged in the hot-bed. When they begin to throw out runners, they should be removed into the fruiting hot-bed in the same manner as practised for Cucumbers and Melons, only one pot of plants being employed for a two- or three-light frame, the beds being previously earthed over, and hillocks raised to the height of twelve or fifteen inches.

The after-management in regard to stopping the plants, the admission of air, the giving of water, covering the glasses in the nights, and keeping up the heat of the beds by linings, must be regulated in the same manner as for the Melon. The spaces between the hills should be gradually earthed up, and the vines be trained so as to fill the frames without crossing or being too much crowded. When they begin to show and set fruit, the heat should be well supported and kept up, that they may be so brought forward as to ripen in due time. When the fruit has attained the state of maturity, it turns rather yellow, and becomes somewhat soft at the top.

In the cultivation of all the sorts and varieties of these plants where the object is the fruit, seed that has been kept some years should constantly be employed, as new seed is apt to grow too luxuriantly.

CULINARY PLANTS, such plants as are employed in the business of cooking, as articles of food, or for the purpose of garnishing different sorts of dishes.

CUPRESSUS, a genus: affording plants of

the evergreen and deciduous ornamental tree kind.

It belongs to the class and order *Monoecia Monadelphica*, and ranks in the natural order of *Coniferae*.

The characters are: that the male flowers are disposed in an ovate ament: the calyx common ament, ovate, composed of scattered flowers; consisting of single-flowered scales, roundish, acuminate on their fore-part, peltate, opposite, about twenty in number: there is no corolla: the stamina have no filaments; the office of them is borne by the calycine scale, to which on the lower part grow four anthers: the female flowers are heaped into a roundish cone on the same plant: the calyx is a common strobile, roundish, composed of from eight to ten florets, consisting of single-flowered scales, which are opposite, ovate, convex beneath, gaping: there is no corolla: the pistillum is a germ scarcely evident: numerous points appear within each calycine scale; supposed germs without styles, each with a simple stigma; subtruncate, concave at the tip: there is no pericarpium: strobile globose, shut, gaping with orbiculate scales, which are angular and peltate beneath: the seeds several, oblong, angular, subulate, small.

The species are: 1. *C. sempervirens*, Evergreen Cypress; 2. *C. disticha*, Deciduous Cypress Tree; 3. *C. thyoides*, White Cedar, or Arbor Vitæ-leaved Cypress; 4. *C. pendula*, Portugal Cypress.

The first has an upright stem, rising to the height of fifteen or twenty feet, with many round branches, either growing upright, or spreading abroad; strigose and toothed with the rudiments of leaves: the fronds are dichotomous, subquadangular; leaflets alternately opposite, decurrent, subcarinate, the older ones distant and mucronate, the younger closely imbricate: the fruit globular or somewhat ovate, on the sides, or at the ends of the branches; when unripe of a dark green colour. It is a native of the Levant, &c.

It has been distinguished into the upright, and horizontal or spreading kind.

The second species rises with a large erect stem or trunk to the height of fifty or sixty feet in its native situation, sending out regular branches to a great distance. The leaves are small, spreading, and deciduous, placed in a distichous manner, or along two sides of the branches.

The third grows to a considerable size in its native situation; but in this climate seldom rises much higher than fifteen feet: when raised from cuttings, it has rather the appearance of a shrub, and is not above nine or ten feet high: the branches are numerous, and stand two ways; the tree naturally forms itself into a regular head: the leaves

are evergreen, flat, sharp, very short, imbricate, and resemble those of the Arbor Vitæ, being small, and of a browner green than in the Common Cypress: the fruit is a blue cone no larger than the berry of the Juniper. It is a native of North America.

The fourth is a small tree, having a glaucous appearance, with the branches spreading irregularly, and bending downwards: the leaves are glandulose, spiral, and imbricate: the flowers like those of the first species.

In Portugal it grows to a large timber tree, but is here seldom above fifteen feet high. It grows naturally at Goa.

Culture.—These plants, in all the sorts, may be raised either from seeds or by cuttings of the young shoots; but those procured from seeds are by much the best plants.

In the first method, the seed, being provided and obtained from the cones, by exposing them to a moderate degree of heat, should be sown towards the latter end of March, or beginning of the following month, on a warm bed or border where the soil is rather light and mellow, and has been rendered fine by being well dug over, covering it in to the depth of about half an inch. When the season proves dry, slight waterings should be occasionally given, and during the summer the plants be kept free from weeds, and be watered a little when the weather is hot. In the winter time they should be protected from frosts by mats or other contrivances. They must be continued under this management till they have attained two years' growth, when they may be removed in the beginning of the spring, and planted in nursery rows in a warm situation, at the distance of eighteen inches or two feet, and eight inches or a foot apart. When they have had three or four years growth in these rows they will be in proper condition for being finally set out where they are to remain. The best time for performing this business is in the beginning of spring.

They may, however, be raised in a more expeditious manner, by sowing the seeds in pots or tubs of light earth, and plunging them in a moderate hot-bed, as in this way they will be fit for removing into nursery rows in the course of twelve months.

As seed of this sort is slow in vegetating, this last method is the most proper for it, as shade may be more conveniently provided during the summer months, and protection in a sunny exposure in the winter; and when the plants do not appear in the course of the first year, the aid of a hot-bed may be conveniently had in the following spring, by which they will be brought forward with expedition to

the state proper for being planted out in nursery-rows.

In the second mode, the cuttings made from the young shoots should be planted in a warm sheltered situation, either in the early autumn or spring months, care being taken to have them daily supplied with water in the following summer. Afterwards the plants should be managed in the same manner as those raised from seed.

This method may be attempted with all the sorts, but those of the Evergreen kind are extremely slow in striking root.

The plants raised in this way are likewise much slower in their growth than those which are produced from seed.

In their general culture, these plants should always be suffered to take their natural growth without clipping or cutting.

All these sorts, from their beautiful growth and closely-placed foliage, have a very ornamental effect in the fronts of large plantations, as well as in groups, with other trees, on the sides of lawns or other parts of pleasure-grounds. They have likewise a fine appearance in clumps, or planted out singly, and also in groups of from three or four to eight or ten of the different kinds, introduced where the extent of mown-grass ground is considerable.

The evergreen sorts, from their beautiful pyramidal growth, produce an agreeable variety, in assemblage with other sorts of plants, when planted near ornamental or other buildings.

The large tree growing sorts may likewise be introduced with great effect in the front parts of plantations of timber trees.

CUTTING, a small portion of a branch, twig, shoot, or other part of a plant cut off for the purpose of planting, with a view of increasing the kind.

There are numerous trees, shrubs, and plants which are capable of being propagated with facility in this way; and in some, the young tender shoots or branches of one or two years growth can only be employed with success; while in others, the large boughs or poles may be made use of with the greatest certainty of their growing. This is the case with most of the aquatic kind; as the willows, poplars, &c. And there are still others in which the leaves can be had recourse to, as the Agave and Aloe kinds.

In the herbaceous and succulent plants, cuttings of one or two years growth are mostly used. But in those of the tree sort, one year; and in those of the hard wooded kind, those of the same year's growth.

The proper lengths for making the cuttings are different in different sorts, according to the

nature and habits of growth of the plants, but in common, from three or four inches to a foot or foot and half; the strongest requiring in general the most length.

In the choice of shoots, branches, or other parts for this use, those of the firmest and most even growth, and the freest from lateral shoots, should be fixed upon. In most strong-shooting trees and shrubs, and all the more succulent plants, the cuttings should be taken from the lateral or terminal shoots. The cuttings in the herbaceous are usually made from the stems that support the flowers, which should be cut off from the bottoms, and afterwards divided into suitable lengths.

In some sorts, as those of the tree and shrub kinds, it is found advantageous, in some cases, to take them off with an inch or more of the former year's wood, as in the Vine, Laurel, and some others.

In the preparation of cuttings for planting, the only thing necessary is that of trimming of such side-shoots as may be present, and occasionally the crooked straggling tops in the deciduous kind; but this should not be done in the evergreen or herbaceous succulent sorts. Where the shoots are of considerable length, the lower parts should principally be employed for the purpose of cuttings.

The proper seasons for planting cuttings are according to their kinds, either the spring, summer, or autumn. The first and the last are in general the best for most sorts of trees and shrubs. Those of the herbaceous and flowering kind mostly succeed best when planted in the spring and summer months; but those of the luxuriant and more succulent sort answer best when put into the earth in the summer season.

In the planting of the cuttings of different sorts of plants, such as those of the tree, shrub, and other kinds that are not succulent, they should be put nearly two-thirds of their lengths into the ground: but those of the succulent sort should only be put lightly into the soil, so as just to support them in their proper position, as when put in too deep they are apt to rot, or do not take root so readily. The cuttings of most of the tree, shrub, and plant kinds should be put into the soil as soon as possible after they are made; but those of the succulent tribe are better to remain out of the earth till the cut parts be fully incrustated or healed over, as when put in while the moisture is oozing out, they are apt to rot and be destroyed. In all the sorts the mould should be well pressed about them, and in the former kinds be kept properly cool by watering. It is also of great use to keep them perfectly steady in the earth.

In the management of cuttings after being planted out, some succeed perfectly in the open ground, others in sheltered shady situations; some require to be placed in pots, for the convenience of occasional protection in severe weather, and others to be plunged in hot-beds in order to promote their striking root, as is fully explained under the Culture of each particular sort.

The length of time which is necessary for striking root is different in the different sorts. In many of the tree, and some of the herbaceous, shrubby, and succulent kinds, it will be perfectly effected in the course of one or two months; and in almost all the sorts in the course of a twelvemonth. When assisted by artificial heat, it is always effected in a more expeditious manner than where the contrary is the case.

In this method of propagation, the varieties of all the different curious species which are capable of being increased in this way, may be equally preserved and kept distinct, as in the practices of budding, grafting, and layering.

CYCLAMEN, a genus containing plants of the low, herbaceous, flowery, perennial tuberous-rooted kind. Snow-Bread.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Preciae*.

The characters are: that the calyx is a half-five-cleft perianthium, roundish, permanent: divisions ovate: the corolla one-petalled: tube somewhat globose, twice as large as the calyx, small, nodding: border bent upwards, five-parted, very large: divisions lanceolate: neck prominent: the stamina consist of five very small filaments in the tube of the corolla: anthers straight, sharp, in the neck of the corolla, converging: the pistillum is a roundish germ: style filiform, straight, longer than the stamens: stigma sharp: the pericarpium is a globose berry, one-celled, gaping five ways at the top, covered with a capsular shell: the seeds very many, somewhat ovate, cornered: the receptacle ovate and free.

The species cultivated are: 1. *C. Europæum*, Common Cyclamen; 2. *C. Coum*, Round-leaved Cyclamen; 3. *C. Persicum*, Persian Cyclamen; 4. *C. hederæfolium*, Ivy-leaved Cyclamen.

The first has a tuberous root, oblatly spheroidal, white within, brown without; from which proceeds, within the ground, a very short stem, and from that the leaves and one-flowered peduncles or scapes: the leaves are kidney-form, roundish, very blunt, slightly crenulate, deep green, and spotted above; beneath commonly red purple, smooth, on very long round red petioles: the flowers drooping, sweet-scented, and purple. It is a native of Austria.

The second species has a round, solid, tuberous root, and low naked stem, furnished with plane orbicular leaves, and short weak petioles; the under side of the leaves very red in the beginning of winter, but that colour goes off in the spring; the upper side smooth, of a lucid green, spreading flat open: the flowers are very bright purple, appearing in the middle of winter. It is a native of the South of Europe.

There are varieties with purplish flowers, and with flesh-coloured flowers.

In the third, the leaves are stiff, on strong fleshy petioles, near six inches long, of a purple colour, as are also the veins of the leaves underneath; but the upper side is veined and marbled with white: the corolla is pure white, with a bright purple bottom. It flowers in March and April, and the seeds ripen in August.

There are varieties with entire white sweet-scented flowers, and with veined and marbled leaves, with pale purple flowers, and bright red or purpled bottoms.

The fourth has a large, orbicular, compressed root: the leaves are numerous on petioles six or seven inches long, marked with black in the middle: the flowers appear before them on long fleshy scapes about August; soon after which the leaves come out, continue growing all the winter and spring till May, when they begin to decay. After the flowers are fallen, the peduncles twist up like a screw, inclosing the germ in the centre, and lie close to the ground among the leaves, which serve as a protection to the seed, which ripens in June. It is a native of Italy.

There are varieties with white and with purplish flowers.

Culture.—These plants are all capable of being increased by sowing the seeds in large wide pots, tubs, or boxes, filled with good light mould, mixed with a little sand, in the latter end of summer or beginning of autumn, covering them to the depth of about half an inch, exposing them at first in situations that have only the morning sun, but afterwards removing them into more warm and sunny exposures; and as the winter approaches, placing them under the protection of frames and glasses, or some other contrivance, fresh air being freely admitted when the weather is mild and suitable. In this way some plants of the hardy sorts will appear about the beginning of the following year, and of all the kinds in the spring. During the beginning of summer, when the weather is hot and dry, slight waterings should be given occasionally; but when their leaves begin to decline in the latter end, they should be removed to an eastern aspect, with only the morning sun, and, as their roots are then in an inactive state, have little or

no water. They should be kept free from weeds in the autumn, and have some fresh mould applied over the surfaces of the pots or tubs in which they grow, protecting them again in the winter as before, continuing the same management as in the preceding year, till the decline of the leaves in the latter part of the summer, when they should be carefully taken up, and the more hardy sorts planted out in the situations where they are to remain, as those of a warm, dry border; and the tender kinds removed into pots, to have protection from frosts in winter.

As the Persian sort is the most impatient of cold and moisture, it should constantly be kept in pots filled with light sandy earth, or a compost of loam and lime-rubbish, and be placed in such situations in the frame or green-house as to have as much free air as possible in mild weather in winter. Some of the sorts will generally begin to flower in the course of one or two years after being thus planted out; the first kind often about Christmas, which is succeeded by those of the Persian sort.

The plants in the borders should have the protection of mats or other contrivances, in severe winters, as by such means they produce a greater abundance of flowers, and these more fair and beautiful.

The varieties of the different sorts are best preserved and continued by planting pieces of the divided roots, immediately after they have been separated in the summer season, in pots, tubs, or other places, as above: but in this mode they do not increase in an expeditious manner.

These plants are very ornamental, though of small growth, in their variegated large foliage, as well as their elegant flowers, which in some of the sorts are fragrant, as those of the spring kinds.

The hardy sorts produce a fine effect in the fronts of borders or clumps in pleasure-grounds, and those of the tender kinds among other potted plants in the green-house.

The proper period of removing these plants for any purpose is about the beginning of June, when the leaves decline; but they should not be often removed, as the roots do not lose their fibres as in some others of the tuberous and bulbous rooted kinds.

CYDONIA, the Quince-Tree. See PRAUS.

CYNARA, a genus containing plants of the herbaceous hardy perennial and biennial kind.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Compositæ Capitatae*.

The characters are: that the calyx is common ventricose, imbricate; scales numerous, roundish, fleshy, increased by a membranaceous scale-formed appendicle, which is large, roundish,

channelled, and emarginated with a spine: the corolla compound tubulous, uniform: the corolllets hermaphrodite, nearly equal: proper one-petalled, funnel-form: tube very slender; border erect, ovate, five-cleft; divisions linear, one more deeply separated: the stamina have five filaments, capillary, very short; anthers cylindric, tubulose, length of the corollule, five-toothed: the pistillum a germ, somewhat ovate: style filiform, longer than the stamens: stigma simple, oblong, emarginate: there is no pericarpium: the calyx converging but a little: the seeds solitary, oblong-ovate, four-cornered compressed: down sessile, long: the receptacle bristly.

The species cultivated are: 1. *C. scolymus*, Common Artichoke; 2. *C. cardunculus*, Cardoon Artichoke, or Cardoon.

The first, in the cultivated state, seldom rises above four feet in height, with a stout, furrowed, leafy stem, slightly tomentose, sometimes a little branched at top. The root is large, thick, and perennial, crowned by a considerable cluster of pinnatifid leaves, from two to four feet in length, pointing upright, the whole covered with an ash-coloured down, especially underneath: the midrib has a deep single channel above, and several deep furrows underneath, with strong ridges between them: at bottom there are usually several separate leaflets or rudiments of leaves, which increase in size till the main leaf begins, and are connected by a wing running down each side of the midrib; which, increasing, unites the remainder into one pinnatifid leaf, very deeply cut, and each cleft has a few large serratures or jags, ending in a short prickle, which is sometimes scarcely perceptible. The leaves on the stem are simple, only serrate or jagged, like a single cleft of the other; they end obtusely, and are frequently retuse; sometimes they have scarcely any serratures; immediately below the heads are some loose scales, partaking of the nature of the upper leaves and calycine scales. The heads are sub-globular, either green or dark purple, the former commonly tinged at bottom with purple; composed of numerous, large, ovate scales, which at bottom are very fleshy, and at top obtuse and emarginate, or cloven. It is a native of the South of Europe.

The varieties are: the Green or French, and the Globe Artichoke; the former having a conical head, of a light green colour, with the scales pointed at top, opening and turning outward; and the latter with a large globular head, a little depressed at top, of a reddish-green colour, obtuse scales, growing close, and turning inwards. This is the most cultivated, as being more fleshy and better tasted.

The second species has thick, fleshy, fibry roots, crowned by a considerable cluster of large, erect, deeply-pinnatifid leaves, four or five feet high, having all the lobes pinnatifid; and thick prickly footstalks; and amidst them, upright tall stems, terminated by scaly, small heads, furnishing flowers and seed, without any eatable substance, as in the Artichoke. It is often biennial in this climate.

Culture.—These plants are increased without much difficulty, if proper care be taken to preserve them from the frosts in winter.

Culture in the Artichoke Kind.—These sorts of plants succeed best in a soil of the light deep loamy kind, well enriched by stable-dung or some other manure. Where the soil is stiff and wet they are liable to be destroyed in the winter season.

Their propagation is effected by planting the off-sets, or suckers produced from the old stools or roots, in the early spring months, as about the latter end of March, in an open situation, in rows four or five feet apart, and the same distances in the rows. The ground should be previously prepared by trenching in the dung to a good spade's depth.

In planting the off-sets, after being separated from the old plants, they should be trimmed in their leaves and other parts, and be then put in by means of a line and dibble to the depth of three or four inches. Some plant two or three plants in one place, but others only one. The latter is probably the better method, as the plants spread very much. Whichever mode is practised, the earth should be well closed about the sets, and a good watering immediately given, especially if the weather be dry; repeating it as there may be occasion.

After this they only require to be kept free from weeds during the summer, which is best performed by hoeing between the rows with a large sharp hoe; and to be protected from frost in the winter.

When large heads are wanted, all the small lateral ones should be removed as soon as they are formed to any size. In some situations the small lateral crooked heads are, however, held in much esteem, consequently must not be rubbed off. The maturity of the heads of the Artichoke is shown by the plates or scales separating from each other considerably.

In cutting the heads, six inches of the stem should be preserved to them, and in many cases, when for market, a foot or more. And care should be taken, that as the heads are cut, the stalks be broken down to the bottom and removed, in order to promote the growth of new suckers.

In order to protect the plants during the winter from being injured by frost, it is the practice

of some to earth or mould up the rows of the plants, so as to cover their crowns, forming the earth into a ridge. This is usually done about the latter end of November or beginning of the following month, the lower leaves being cut and removed before the work is attempted. The author of the Scotch Forcing Gardener, instead of ridging up the plants, advises, that they should be carefully covered with stable-dung or other litter in the beginning of winter, which he considers as better than digging trenches and moulding up with the earth from them, as the roots in that way are, he supposes, doubly exposed. Many instances have occurred where the plants managed in that method have been destroyed, while those well covered by litter have not sustained the least injury.

About the middle of March or beginning of the following month, when the plants have begun to shoot, the ridges should be levelled down, removing all the unnecessary shoots, only leaving one or two on each plant. This work should be performed when the weather is dry, and the mould be well cleared and removed from the crowns of the plants.

Where they have been covered with litter, the coarse parts should be removed about the same time, and the more reduced and rotten parts dug in, previously removing the shoots as in the former case, to prevent their being too much crowded, and producing small heads.

This culture must be repeated every year for the old roots or stools, which should not be suffered to continue more than seven or eight years in the same situation, as they then begin to produce heads that are smaller in size.

Where successions of this sort of crop are wanted, a few of the best off-sets should be planted every year as soon as possible after being taken off, in the manner that has been directed above. This practice not only keeps up the stock of plants, but continues the season of having the produce, as the young plants afford their heads much later than the old ones.

When the off-sets are to be conveyed to a distance, they should be carefully packed, eight or ten together, when dry, and bound round with a hay-band, the whole being then placed in a hamper or mat. In this case some advise moistening the roots before planting them out.

The globular-headed sort is the larger and more fleshy, but the green conical-headed the more hardy.

Culture in the Cardoon Kind.—This is accomplished, by sowing the seed in the latter end of April or beginning of May, or later, in the places where the plants are to remain. It is best done by forming trenches at the distance of

about five feet from each other in the manner directed for Celery; to the depth of a good spade, placing the mould on the sides or interspaces; then to point in a little well rotted compost manure in the bottoms, and make a small drill in the centre to the depth of an inch, dropping in the seeds two or three inches apart, covering them with the mould.

A little water should be given at the time when the season is dry.

When the plants have advanced two or three inches in their growth, they should be thinned out to the distance of ten or twelve inches. And as they proceed in their growth, they should be gradually moulded up when dry, in order to be blanched and rendered tender, in the same manner as practised for Celery; only the leaves being carefully gathered and tied together each time with a little old matting, in order to prevent the mould from getting between them.

It is likewise the practice with some to raise the plants on beds, and afterwards transplant them into drills, or holes, where they are to remain and be earthed up for blanching.

In order to have a longer succession of these plants, the moulding up should be performed at different times, from about the beginning of September, as the distance of a fortnight or three weeks.

These plants succeed best on such soils as are of the more deep sandy loam kinds, which have not been much enriched by manure.

In order to save seed, some of the best plants should be suffered to remain without being blanched, and be protected by litter during the winter, and in the spring they will shoot up into flower, and produce ripe seed in the autumn.

The roots of the Cardoon are capable of being preserved in the winter season in the same manner as the Carrot, Celery, and other similar plants.

CYNOGLOSSUM, a genus affording plants of the herbaceous annual and perennial ornamental kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a five-parted, oblong, acute, permanent perianthium; the corolla is one-petalled, funnel-form, length of the calyx: tube cylindric, shorter than the border: border half-five-cleft, obtuse: mouth closed with five squamules, which are convex, prominent, converging: the stamina consist of five very short filaments, in the mouth of the corolla: anthers roundish, naked: the pistillum has four germs: style subulate, length of the stamens, permanent: stigma emarginate: there is no pe-

ricarpium; but four arils of the seeds, depressed, roundish, outwardly more obtuse, scabrous, not gaping, on the exterior side somewhat flattish, aimed by their tip: the seeds as many, somewhat ovate, gibbous, acuminate, smooth.

The species cultivated are: 1. *C. linifolium*, Flax-leaved Hound's Tongue, or Venus's Navel-wort; 2. *C. Lusitanicum*, Portugal Hound's Tongue, or Venus's Navel-wort; 3. *C. omphaloides*, Comfrey-leaved Hound's Tongue.

The first seldom rises more than five or six inches high; the stalks do not branch near so much as those of the second sort: the leaves are very narrow and long, of a grayish colour, and smooth: the flowers grow in short loose panicles at the ends of the branches; are white, like those of the second, but smaller, and have umbilicated seeds, whence the name of Navel-wort. It is a native of Portugal, flowering in June.

In the second species, the whole plant is very smooth: the stem erect, round, a foot high, the branches axillary, alternate, quite simple: the leaves an inch long, gradually smaller upwards, blunt, veinless, glaucous-green: the flowers in spikes at the ends of the branches. It is a native of Portugal, flowering in June and the following month.

These two species are annual.

The third has a perennial root; branches trailing, and putting out roots from the joints: the leaves are bright green, on long slender foot-stalks: the flowers shaped like those of Borage, but smaller, and of a lively blue colour, coming from the axillas or stems in loose panicles, appearing in March and the following month.

Culture.—The two first, or annual sorts, are usually increased by sowing the seeds in the early spring, in patches, in the borders, clumps, or other places where the plants are to remain and flower, covering them in lightly. When the plants appear, they only stand in need of being kept clean, and having a little water occasionally given them.

In order to protract the flowering, two or three different sowings should be made at proper intervals in these sorts.

The third, or perennial sort, may be easily propagated by taking off the rooted stalks, and planting them out in the situations where they are to remain, either in the spring, summer, or autumn.

These plants add to the ornament and variety of borders, clumps, and other parts of pleasure-grounds.

CYPRIPEDIUM, a genus containing plants of the hardy herbaceous perennial flowery kind.

It belongs to the class and order *Gynandria*

Diandria, and ranks in the natural order of *Orchideæ*.

The characters are: that the calyx has vague spathes: spadix simple: there is no perianthium: the corolla has four or five petals, lanceolate-linear, very long, spreading, erect: nectary within the lower petal, slipper-form, inflated, obtuse, hollow, shorter than the petals, broader: upper lip ovate, flat, inflex, small: the stamina consist of two filaments, very short, seated on the pistillum: anthers erect, covered by the upper lip of the nectary: the pistillum is a long, twisted, inferior germ: style very short, growing to the upper lip of the nectary: stigma obscure: the pericarpium is an obovate capsule, obtusely three-cornered; with three sutures, under which it gapes in the corners, three-valved, one-celled: the seeds are numerous, very small: receptacle linear, growing lengthways to each valve of the pericarpium.

The species are: 1 *C. calceolus*, Common Ladies' Slipper; 2 *C. bulbosum*, Bulbous Ladies' Slipper; 3 *C. Japonicum*, Japanese Ladies' Slipper; 4 *C. album*, White Ladies' Slipper; 5. *C. acaule*, Two-leaved Ladies' Slipper.

The first has the root composed of many fleshy black fibres, spreading obliquely near the surface; the fleshy part retaining the mark of the stalk produced the former year; a new root being annually formed on the side of the old one: the stalks two, three, or more, in proportion to the strength of the root; nine, ten, or twelve inches high, and a little hairy: the leaves are from three to near four inches long, and near two inches broad at their base, of a deep green, and ending in acute points. Four or five of these leaves are placed alternately along the stalk. In the bosom of the upper leaf is inclosed the flower-bud, supported by a slender peduncle, which generally turns a little on one side; and before the flower opens advances above the sheath. The corolla has four narrow petals, of a dark purple colour, placed in form of a cross, and spreading wide open. In the centre is situated the nectary, shaped like a wooden shoe, of a pale yellow-colour, with a few broken streaks: the opening is covered with two ears; the upper one tender, white, and spotted with purple; the lower thick, and of an herbaceous colour. It is a native of Lapland, flowering in May.

In the second species the root is a bulb, throwing out a few thick fibres from its lower part, and invested with a semi-transparent, acute, erect membrane, rising far above its top: the leaf is radical, solitary, petioled, oval, somewhat pointed, entire, ribbed, smooth, dark green, spotted with brown: the stalk is three inches high, erect, round, one-flowered, invested with two

tubular, membranous sheaths: bracte solitary, not far from the flower, linear-lanceolate, acute, purplish: the flower a little inclined. It is native of Lapland, &c.

The third has a round, erect stem, villose, a foot high: the leaves in the middle of the stem two, embracing, acute, sinuate-waved, smooth, a hand broad: below the flower is a sessile, solitary, oblong, acute, entire leaflet, scarcely an inch in length: the flower terminating, solitary, the size of that of the common species. It is a native of Japan, flowering in April and the following month.

The fourth species has fibrous roots, with several upright stalks a foot high. The leaves are ovate-lanceolate, cauline, and ribbed, placed alternately, and embracing the stem, which has a white flower at top: the large nectary is tinged with purple. Martyn observes, that there are few flowers which to such singularity of structure add such elegance and beauty. It is a native of North America.

The fifth has rarely more than two radical leaves, and a very short flowering stem, in comparison with the others, but a large nectary in proportion to the size of the plant, divided on its upper part through its whole length, so as to destroy, in a great degree, that shoe- or slipper-like form from which this genus has its name. It is a native of North America, and flowers in March.

Culture.—These plants are not easily preserved in garden culture. They should remain where they are planted, if they be designed to flower as soon as possible, as they do not bear transplanting well, and are retarded in flowering by it.

The usual method of raising them, especially in the first, fourth, and bulbous kinds, is, in the former, by dividing their knotty, fibrous, creeping roots, taking off the joints or side off-sets, and planting them where they are to remain, immediately after the stems decay; and in the latter by off-sets from the roots planted at the same time.

But the best method is to procure the plants or sets from the places where they grow naturally.

They succeed the most perfectly in a loamy undunged soil, and where they have only the morning sun. The English species answers best in pots, when set in a sheltered situation. The American kinds are rather tender, requiring shelter in the winter season.

These plants are highly curious and ornamental in the shady parts of the clumps and border of pleasure-grounds.

CYRTANTHUS, a genus furnishing plants of

of the bulbous-rooted perennal kind, for the green-house.

It belongs to the class and order *Hexandria Monogymia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that there is no calyx: the corolla one-petalled, club-shaped, bent, six-cleft at top; segments ovate-oblong; the three inner blunt, the three outer terminating in a little horn: the stamina consist of six filaments, fastened to the tube, filiform-subulate, a little shorter than the corolla: anthers oblong, erect: the pistillum is an inferior germ, ovate, obtusely three-cornered: style filiform, the length of the corolla: stigma trifid.

The species are: 1. *C. angustifolius*, Narrow-leaved Cyrtanthus; 2. *C. obliquus*, Oblique-leaved Cyrtanthus.

The first has a bulbous root, crowned by straight, narrow, keel-shaped leaves closing at their base; and flower-stalks one foot high, terminated by umbellate clusters of scarlet nodding narrow purple flowers, between two and three inches long each, with a bent tube. It is a native of the Cape.

The second species has a fleshy bulbous root, smooth oblique leaves, and umbellate pendulous simple flowers, terminating in a foot-stalk about one foot high. It is also a native of the Cape.

Culture.—These plants are capable of being increased either by off-sets from the roots or by seeds, but the first is the best method.

The off-sets should be taken from the roots when the stems begin to decay, and planted out in separate pots, placed under the protection of the green-house or in a garden-frame.

In the latter method the seeds should be sown in pots in the spring season, and plunged in a moderate hot-bed.

When the plants come up, and are of sufficient growth, they should be removed into separate pots.

In both methods they afterwards require the same kind of management as other bulbous-rooted plants from the same quarter.

CYTISUS, a genus containing plants of the hardy evergreen and deciduous flowering shrubby kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-form, short, obtuse at the base: mouth two-lipped; upper-lip two-cleft, acuminate; lower three-toothed: the corolla is papilionaceous: standard ovate, rising upwards, sides reflex: wings the length of the standard, straight, obtuse: the keel somewhat belled, acuminate:

the stamina consist of diadelphous filaments, (single and nine-cleft) rising upwards: anthers simple: the pistillum is an oblong germ: style simple, rising upwards: stigma obtuse: the pericarpium is an oblong legume, obtuse, attenuated at the base, stiff: the seeds few, kidney-form, compressed.

The species are: 1. *C. Laburnum*, Laburnum; 2. *C. sessilifolium*, Common Cytisus; 3. *C. hirsutus*, Hairy or Evergreen Cytisus.

The first has a large upright tree-stem, branching into a full-spreading head, from ten to twenty feet high, having smooth greenish branches, trifoliate, oblong-oval entire leaves, on long slender foot-stalks; and from the sides of all the branches numerous yellow flowers collected in long spikes, hanging loosely downward; appearing in May. It is a native of Switzerland.

The varieties are: the Common broad-leaved; the Narrow-leaved; Long-spiked, having very long pendulous spikes of flowers; the Short-spiked, having short, roundish, thick spikes of flowers; and the Variegated-leaved Laburnum.

The second species rises with a woody stalk, putting out many branches, covered with a brownish bark: the leaflets are obovate, ternate, on very short petioles: the flowers in close short terminating racemes, of a bright yellow colour: it rises to the height of seven or eight feet, and becomes very bushy. It is a native of the South of Europe.

The third has a soft shrubby stalk, dividing into many branches, which grow erect, and frequently rise to the height of eight or ten feet: the stalks, branches, and leaves are very hairy; the leaves are ternate, ovate, and placed closely on the branches: the flowers come out from the side of the stalk in short racemes, and are of a pale yellow, appearing in June. It is a native of the South of Europe.

Culture.—These plants are all capable of being increased by seeds, and many of them by cuttings and layers.

In the first mode the seed should be sown, either on beds or where the plants are to remain, in the spring, as about March, being in the first mode, when of sufficient growth, transplanted into nursery rows, to remain till of a proper size for being planted in the situations where they are to grow. When sown where they are to remain, they only require to be kept perfectly free from weeds, and trimmed to one good plant in a place, giving the tender sorts the protection of mats during the severity of the winter season.

The trees of most of the sorts afford seeds in abundance in the autumn.

The cuttings should be made from the young

shoots ten or twelve inches in length, and planted out in a rather moist, shaded situation, either in the early autumn or spring months, in rows twelve or eighteen inches apart, and eight or ten in the rows. They mostly become well rooted in the course of twelve months; and should then be kept perfectly clear of weeds.

Layers may be laid down either in the summer, autumn, or spring seasons; and when the plants are well rooted they should be taken off and planted out in nursery-rows, as described above.

In the nursery they only require to be preserved from the injury of weeds, and to have the land dug well between the rows annually in the

autumn, till they are removed; being suffered to take their natural growth in a great measure.

Most of the sorts are hardy, and succeed well in almost any soil or situation. The third sort should have a dry soil and sheltered situation, as it is liable to be injured by frost. It may also be planted in pots, and placed in the greenhouse during the winter.

They are all very ornamental plants for the borders, clumps, and other parts of ornamented grounds, affording much variety by their numerous beautiful bunches of flowers. The large sorts should be placed towards the back parts, and those of less growth towards the fronts and more conspicuous parts.

D A I

DAFFODIL. See **NARCISsus**.

DAIS, a genus containing a plant of the deciduous shrubby ornamental kind for the green-house.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Vepræculæ*.

The characters are: that the calyx is a four-leaved involucre, sessile-many-flowered: the leaflets scariose, erect: there is no perianthium: the corolla one-petalled, funnel-form, longer than the involucre: tube filiform, rude: border five-cleft: divisions lanceolate, obtuse: the stamina consist of ten filaments, inserted into the throat, shorter than the border: the alternate ones shorter: anthers simple: the pistillum is a germ somewhat oblong, growing on the base of the corolla: style filiform, length of the tube: stigma globose, ascending: the pericarpium is a berry ovate, one-celled: the seed single, ovate.

The species cultivated is *D. cotinifolia*, Cotinus-leaved Dais.

The leaves are opposite, obovate, quite entire, smooth, and petioled: the flowers in a bunch aggregate, terminating, pubescent; with a gemmaceous four-valved involucre: the fruit is a small nut of an ovate-acuminate form, with a thin bark over it, and clothed with the permanent corolla: the epidermis is membranaceous, pale, diaphanous, thickening on each side into a prominent, whitish edge, easily separating: shell bony, thin, brittle, livid-white on the

D A P

outside, black within; one-celled and valveless. It is a native of the Cape of Good Hope.

Culture.—This shrubby plant is capable of being increased, by sowing the seed procured from Holland in pots of light earth in the spring, and plunging them in a hot-bed: when the plants have attained sufficient growth, they should be removed into separate pots, and placed in the protection of the green-house.

It sometimes succeeds by layers and cuttings made from the young shoots.

The difficulty of increasing it renders it a scarce plant.

DAPHNE, a genus comprising plants of the low shrubby ornamental, evergreen, and deciduous kinds.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Vepræculæ*.

The characters are: that there is no calyx: the corolla one-petalled, funnel-form, withering, including the stamens: tube cylindric, imperforate, longer than the border: border four-cleft; divisions ovate, acute, flat, spreading: the stamina have eight, short filaments, inserted into the tube; the alternate ones lower: anthers roundish, erect, two-celled: the pistillum is an ovate germ: style very short: stigma headed, depressed-flat: the pericarpium a roundish one-celled berry: (drupe berried superior;) the seed single, roundish, fleshy.

The species are: 1. *D. Mezereum*, Mezereon; 2. *D. Laureola*, Wood or Spurge Laurel; 3. *D. tar-*

touraira, Silvery-leaved Daphne, or Tartouraira; 4. *D. cneorum*, Trailing Daphne; 5. *D. odora*, Sweet-smelling Daphne.

The first is a shrub, growing to the height of from three or four to five or six feet, with a strong woody stalk, putting out many woody branches on every side, so as to form a regular head. The leaves are smooth, about two inches long, and three quarters of an inch broad in the middle, placed without order. The flowers come out very early in the spring, before the leaves, in clusters all round the shoots of the former year. The fruit is a superior berried drupe, first green, then red, of an ovate-globular form; with a thin succulent pulp, and a crustaceous, thin, brittle, black shining shell. It is a native of Lapland, &c. flowering in January, in mild seasons.

Martyn remarks, that there are two principal varieties; one with a white flower, succeeded by yellow berries; the other with peach-coloured flowers and red fruit: the latter has sometimes flowers of a much deeper red: and that there is also a variety with variegated leaves.

The second species is a low evergreen shrub, rising with several stalks to the height of two or three feet, dividing at top into several branches. The leaves come out irregularly on every side, sit pretty close to the branches, are thick, smooth, and of a lucid green. Among these, towards the upper part of the stalks, come out the flowers in small clusters; they are of a yellowish green colour, and appear soon after Christmas if the season be not very severe. They are succeeded by oval berries, which are green till June, when they ripen and turn black, soon after which they fall off. It is a native of Britain, &c.

The third species is a low shrubby plant, which sends out several weak stalks from the root, about a foot long, and spreading about irregularly; these seldom become woody in England, but are tough and stringy, covered with a light bark: the leaves are small, very soft, white and shining like satin, and sit pretty close to the stalks: between these, white flowers come out in thick clusters, commonly two or three together, very seldom solitary, bell-shaped, silky on the outside, but yellowish within, imbricated at the base with four or more ovate keeled scales. It is a native of the South of France.

The fourth species is a very humble shrub, seldom more than one foot high: the stems are branched; the leaves narrow lanceolate, placed without order: the branches terminated by small clusters of purple flowers, which stand erect: the flowers emit a pleasant odour, and appear early in the spring. It is a native of France, &c.

It varies with white flowers.

The fifth has the stem becoming shrubby, dichotomous, smooth, naked, erect; the branches, like the stem, from divaricate erect: the leaves at the top of the last branchlets, approximating, sessile, acute, quite entire, spreading, bent back at the tip; deep green on the upper surface, with a groove along the middle, paler underneath; unequal, thick, evergreen, an inch in length: the flowers about eleven in number, of a purple colour. It is a native of Japan, flowering here from December to March.

Culture.—These plants are capable of being raised in different methods according to the kinds.

The first sort and varieties are best propagated by sowing the seeds or berries, as soon as they have become perfectly ripe, as about August, on beds of light sandy earth, covering them in to the depth of half an inch. When possible, a south-easterly aspect should be chosen. And to preserve the seeds in a perfect state, the shrubs should be netted in the latter end of the summer, to prevent the attacks of the birds.

The young plants generally appear in the following spring, when they should be kept clear from weeds, and the largest ones removed when too close together: they may remain in these beds till the beginning of the second autumn, when they should be removed, and set out in nursery-rows, at the distance of a foot and half, and ten or twelve inches in the rows, great care being taken not to break or injure their roots. After they have had two years' growth in these situations, they are in a proper condition for being planted out where they are to remain: and as the plants flower very early in the spring, the best time for removing them is in the early part of the autumn.

The plants grow to the greatest size, and flower in the most full and perfect manner, when the soils are of a dry quality: as in moist, adhesive soils they are apt to become mossy.

The second species may be increased by sowing the seeds in the same manner as the above; and also by cuttings and layers of the young shoots: these should be planted out or laid down in the beginning of the autumn, and in the following autumn they will be well rooted: the layers may be then taken off, and planted where they are to remain, or put into nursery-rows as above. The cuttings may likewise be treated in the same way.

The third and fourth sorts succeed best when raised from seed procured from abroad, and sown on a warm dry situation, in the early autumn, in the places where the plants are to remain, as they do not bear transplanting well. The ground should be as little as possible stir-

red about the plants. The former should have a dry warm aspect where the land is poor, but the latter succeeds in such as are more cool: these plants are sufficiently hardy to succeed in the open air, when the winters are not very severe.

The last sort is raised by sowing the seeds procured from its native situation, on a gentle hot-bed in the autumn or spring, and when the plants are of sufficient growth removing them into separate pots, to be placed under the protection of the greenhouse. It is much more tender than the other sorts.

The first and second kinds are highly ornamental plants in the clumps, borders, and other conspicuous parts near the house, the former flowering early, and where many are together affording a fine fragrance.

The other sorts, though more tender, are curious, and afford an agreeable variety in assemblage with others of similar growth, either in the borders or among potted plants.

DATURA, a genus affording plants of the herbaceous flowery annual kind. Thorn Apple.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Lauridæ*.

The characters are: that the calyx is a one-leaved, oblong perianthium, tubular, bellied, five-cornered, five-toothed, horizontally deciduous near the base, the remaining circular part permanent: the corolla one-petalled, funnel-form: tube cylindric, almost longer than the calyx: border erect-expanding, five-cornered, five-plaited, almost entire, with five acuminate teeth: the stamina consist of five subulate filaments, length of the calyx: anthers oblong, compressed, obtuse: the pistillum is an ovate germ: style filiform, straight: stigma thickish, obtuse, two-plaited: the pericarpium is a somewhat ovate capsule, two-celled, four-valved, seated on the base of the calyx: receptacles convex, large, dotted, affixed to the dissepiment: the seeds numerous and kidney-form.

The species cultivated are: 1. *D. Stramonium*, Common Thorn-apple; 2. *D. Tatula*, Blue Thorn-apple; 3. *D. fastuosa*, Purple Thorn-apple; 4. *D. Metel*, Hairy Thorn-apple; 5. *D. arborea*, Tree Thorn-apple.

The first has the stem from one to six feet in height, according to the soil, but seldom more than two feet, round, smooth; dividing into many strong, irregular branches, which are hollow, covered with a fine down: the leaves from the forking of the stem and branches, single, scarcely six inches long, petioled, pointed, deep green on the upper surface, paler beneath and on the edges, with strong ribs or nerves, unequally

sinuated and toothed about the edge, extending further down the petiole on one side than on the other: the petioles round, downy, shorter than the leaves, above faintly channelled: the flowers single from the axils, on short peduncles, upright (first from the forks of the branches, and afterwards near the extremities), of a whitish colour, succeeded by oval prickly capsules, termed thorn-apples. It is a native of America.

The second species resembles the common sort, but is twice the size: the stem is purplish with white dots, divided at an acute angle, smooth and even: the leaves more finely toothed, and, if they be flatted, cordate: the flowers pale blue, or purple, succeeded by erect spinous capsules.

The third rises with a fine polished purple stalk four feet high, dividing into several branches: the leaves are large, smooth, sinuated, on pretty long foot-stalks: the flowers are produced at the divisions of the branches; they have large swelling tubes, which spread very broad at the top, their brims having ten angles, each ending in a long slender point, are of a beautiful purple on their outside and a satiny white within; some of them single, others with two or three flowers standing one within another, and some double, having four or five petals within each other of equal length, so as to appear a full flower at the brim; they have an agreeable odour at first. It is a native of the East Indies.

The fourth species has a strong stem three feet high, dividing into many woolly branches: the leaves have only two or three slight indentures on their edges: the flowers have long tubes, which extend beyond the bifid calyx, then spreading out very broad where the brim is divided into ten obtuse angles; they are of a pure white above, but the tubes have a tincture of green within: they are succeeded by roundish fruit closely covered with thorns. It is a native of Asia, &c.

The fifth rises with a woody stalk to the height of twelve or fourteen feet, dividing into several branches. Leaves oblique, six inches long, two inches and a half broad in their widest part, growing narrower at each end, downy, on long footstalks, which stand nearer to one side than the other. The flowers come out at the divisions of the branches; they have a loose tubular calyx near four inches long, which opens at the top on one side like a spathe: the tube of the flower is narrow; but above, it swells very large, near six inches in length, then spreads open at the brim, where it is divided into five angles, which terminate in very long points; they are white, with some longitudinal

stripes, of a pale yellow on their outside; a single tree will perfume the air of a large garden. It is a native of South America.

Culture.—These plants are propagated annually, by sowing the seeds in the two first or hardy sorts in the clumps, borders, or other places where the plants are to remain, in patches of four or five together, covering them in to the depth of nearly half an inch. When the plants are up the weakest should be removed, so as to leave only one or two of the strongest in each place; but in the latter or tender sorts the seed should be sown in the spring season, as the latter end of March or beginning of the following month, either on a hot-bed covered by frames and glasses, or in pots, and managed as other tender annuals, admitting air to them freely in their early growth, and when some inches high removing them into separate pots, replunging them in the hot-bed so formed as to draw them up to a pretty tall growth. When the weather becomes settled warm, as about June, they may be removed into the open air, being previously hardened by due exposure, either in the pots, or planted out in the borders or other places, with balls of earth about their roots. The two first kinds are the best suited to the last method.

The first and second species are adapted to large borders of pleasure-grounds, where they have a good effect in mixture with others of similar growth; but the first is sometimes troublesome as a weed. The other kinds, from the beauty of their flowers, produce a pleasing variety in assemblage with other potted annual plants. See ANNUAL PLANTS.

DATE PLUM. See DIOSPYROS.

DATE TREE. See PHENIX.

DAUCUS, a genus containing a plant of the esculent kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel, manifold, flowering flat, fruiting concave-converging: partial manifold, similar: involucre universal, many-leaved length of the umbel: leaflets linear, pinnatifid: partial more simple, length of the umbellule: perianthium proper scarce manifest: the corolla universal difform, somewhat rayed; floscules of the disk abortive: proper of five petals, inflex-hearted; the exterior ones larger: the stamina consist of five capillary filaments: anthers simple: the pistillum is an inferior germ, small: styles two, reflex: stigmas obtuse: there is no pericarpium: the fruit ovate, often hispid on every side with stiff hairs, bipartite; the seeds two, somewhat

ovate, on one side convex, hispid, on the other flat.

The species cultivated is *D. Carota*, Common Carrot.

It has a long, large perpendicular tapering root, from fifteen to eighteen inches in length, with long erect finely divided leaves, having the stem three feet high in its flowering state; it differs little from the wild carrot, except in the largeness and succulency of the plant, and particularly of the root, which with its superior size usually takes a tincture of yellow in different shades to deep orange, and becomes of a softer texture, without any of that acrimony and aromatic flavour which is found in the wild root: it has white flowers on all the branches. It is annual, flowering from June to August.

There are varieties with orange coloured roots, termed Orange Carrot, with a shorter red root, termed Early Horn-carrot, with a purple root, and with a light yellow root.

Culture.—In the culture of this useful vegetable, a deep light soil should be employed as much as possible, and when of a sandy quality it is still more advantageous. It should have been well manured the preceding year, as when it is applied the same year the roots are apt to be affected with the canker. Where it is made use of the same year, it should be well rotted, as such as has been used in the hot-bed.

In preparing the ground, it should be well trenched over at no great length of time before the period of sowing, to the full depth of eighteen inches, the lumps being well broken and reduced, and the manure when used at the time completely turned in. When this business is not performed in a perfect manner, the roots are liable to spread in a lateral manner, and become branched.

The situation should be open, and free from the droppings of trees, or other inconveniences of the same kind.

The seed for this crop should always be such as has been collected from plants of the preceding year, and which is perfectly fresh and well ripened; as old seed never answers well in this culture, much of it being in a state incapable of vegetating.

The sort most proper for the different garden crops, is for the early ones the Horn-Carrot, but for the general crop, the Orange is constantly to be employed, not only as growing more large, but more straight and handsome, and keeping better, as well as being more sweet and pleasant in the taste.

The other varieties may be grown where variety is wanted. Whatever sort is made use of, it is of much consequence to have genuine seed.

The time of sowing this sort of crops must vary according as they are wanted. When they are required in succession, three or four different sowings should be made from January till the beginning of May; but for the principal crop, the sowings should always be performed about the latter end of January, or in the beginning of the following month. A sowing may likewise be made in August, to stand through the winter, for producing an early spring crop; or early crops of this sort may be obtained by forcing them on hot-beds. The principal crop generally becomes ready for use about the beginning of June.

In the sowing of the seed, after the surface of the beds has been rendered perfectly smooth and even by the rake, it should be distributed in as even a manner as possible over the whole, and then carefully raked in. As the seed is of a light and chaffy nature, a calm dry time should be chosen for the purpose, to prevent its being blown in an irregular manner into heaps. It is also useful to rub and separate the chaffy parts of the seed well before sowing, and some think it an advantage to have sand or dry fine mould well mixed with it. It should be sown moderately thick, especially when the soil inclines to be heavy. In very light soils it is sometimes the practice to tread in the seed, to prevent its rising in heaps, raking the surface over afterwards; but this should never be done where there is any degree of stiffness in the land. The sowings are usually performed on beds of four or five feet in breadth, but they may be made on large plats where necessary.

After the plants have attained three or four inches in growth, they should be thinned out to from six to eight inches distance, in proportion to the size that is wanted; and be kept perfectly free from weeds: this is performed by a small hoe with the greatest readiness; but some thin their plants out by the hand; the former is however the better method, as the earth is at the same time stirred about the roots of the plants. The work is best done when the weather is dry. The crops should afterwards be occasionally looked over every fortnight or three weeks, to be further thinned when necessary, and to keep the weeds from rising.

Where these roots are much wanted at an early period while young, it is better to sow a piece of ground for the purpose than to depend upon the thinning of the general crops.

The crops put in in August for the following spring produce, should be managed in the same way, but it will be necessary to protect the plants in winter, when the weather is severe, by coverings of some light dry materials,

such as litter, straw, &c. so as to prevent their tops from being injured.

Culture on Hot-beds for early Use.—In this method crops may be provided for early use where those of the autumn have been injured or destroyed.

In this intention the sowings should be made in the beginning of January and the following month, on hot-beds formed of dung, moulded eight or ten inches deep, and covered by frames and glasses. In the growth of the plants air must be freely admitted by having the glasses removed, except in the night-time and when the weather is severe. When the plants are an inch or two in height, they must be thinned out to the distance of three or four inches, and occasionally supplied with water in a moderate proportion. When the heat of the beds declines much, linings should be had recourse to as there may be occasion.

By this management these roots may be provided a month or six weeks sooner than in the other methods.

In order to preserve the roots of the main crops in the winter, they should be taken up about November, when the season is dry; and when sufficiently dried in the air, and cleared from earth, and their tops cut off close, be packed up in dry sand in a shed, cellar, or other convenient place, being well covered on the top with straw. In this mode they may be preserved till March or April. If they are suffered to remain in the ground, they are not only liable to be destroyed by vermin, but to become canker, and rotten.

In order to save the seed of these plants, some of the finest roots should be planted out about February, in rows two feet apart, and one foot distant from plant to plant. They shoot up to stem in April or the following month, flower about June, and in August the seed becomes ripe; then the tops should be cut off when dry, exposed in the sun, and, after becoming perfectly dry, the seed thrashed out, and put up into bags for use.

DECIDUOUS PLANTS, such plants, whether of the tree or shrub kind, as shed or lose their leaves in the autumnal or winter seasons.

It embraces a great variety of both the former and latter sorts, in most of which the leaves begin to fall off in the autumn, and the whole are naked during the winter season.

Almost all the valuable timber and fruit-trees are of this tribe, as well as the greatest part of the ornamental trees and shrubs that are introduced in plantations and shubberies. There are likewise several other plants that may be termed deciduous, from their shedding their leaves on

the approach of winter. See FRUIT- and FOREST-TREES.

This sort of trees and shrubs are in general of hardy growth, being capable of succeeding well in the full ground in different situations, according to their kinds.

Particular descriptions of the different sorts, as well as of their habits of growth, culture, management, and uses, are given under the genus to which they respectively belong.

The proper seasons for removing this kind of plants from the nursery or other places, and planting them out where they are to remain, are either the early spring or autumn, according to the kind and the nature of the soil. In general, where the land is dry, the latter is the more proper and advantageous; but in the contrary circumstances the former may be the more advisable. In the planting out all trees, shrubs, and other plants of this sort, sufficiently large openings should be formed for the roots to be conveniently bedded in, after having been suitably trimmed according to the kinds; and the mould be made fine and well mixed in with the roots by slightly shaking the plants, and then well trodden in about them. In the early plantings at both seasons it is of much advantage, especially when the weather is dry, to have them well watered occasionally, and most of the sorts should be kept steady in their situations by proper stakes, as they never succeed well where this is not the case.

DELPHINIUM, a genus comprising plants of the herbaceous flowery hardy annual and perennial kinds. *Dolphin* flower.

It belongs to the class and order *Polyandria Trigynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx: the corolla has five petals, unequal, disposed in a circle; of which the uppermost in some is more obtuse than the rest in front, and is extended behind into a tubular, straight, long, obtuse horn: the rest ovate-lanceolate, spreading, nearly equal: nectary two-cleft, seated in front within the circle of petals on the upper part, behind stretched out, involved within the tube of the petal: the stamina have very many filaments (fifteen or thirty), subulate, wider at the base, very small, inclined towards the petal: anthers erect, small: the pistillum consists of three or one germ; ovate, ending in styles the length of the stamens: stigmas simple, reflex: the pericarpium has as many capsules, ovate-subulate, straight, one-valved, gaping inwards: the seeds very many, and cornered.

The species mostly cultivated are: 1. *D. adjacis*, Upright Larkspur; 2. *D. grandiflorum*,

Great-flowered Bee Larkspur; 3. *D. elatum*, Tall Bee Larkspur.

There are other species that may be cultivated. The first is annual, and has the stalks eighteen inches and more in height, seldom branched: the leaves are finely divided, commonly by threes, on broad petioles: the segments are linear, quite entire, and channelled above; the spike of flowers erect, dense, and of different colours.

There are varieties with single and double blue flowers; with single and double purple flowers; with single and double silver-coloured flowers; with single and double violet-coloured flowers; with single and double ash-coloured flowers; with single and double striped flowers; Large Rocket Larkspur, and Dwarf or Rocket Larkspur.

The second species has a perennial root, which puts out two or three branching stalks every spring, rising about a foot and a half high: the leaves are smooth and of a light green colour above, and hoary beneath, composed of many narrow segments, which terminate in several acute points: the flowers come out towards the upper part of the stalks singly, each on a long naked peduncle; they are large, and of a fine azure colour. They appear in June and July, and the seeds ripen in autumn. It is a native of Siberia.

The third rises to the height of a man: the root is perennial: the leaves slightly villose, becoming smooth by age, half-five-lobed, petioled; lobes acute, often half-three-lobed, sharply serrate. The spikes of flowers very long and handsome, of a deep blue colour, with a wrinkled spur. It is a native of Switzerland, &c. flowering from June to September.

Culture.—These plants, in all the sorts and varieties, are propagated by sowing the seeds in the early spring, as in February, March, or the following month, or in the autumn immediately after the seeds become ripe, in the clumps, borders, or other places where the plants are to remain, as they do not succeed so perfectly by transplanting, in patches of eight or ten in a place, covering the seed in to the depth of nearly half an inch, the mould being previously rendered fine.

Where the annual sort and varieties are cultivated for a large show, the seed may be sown thinly in drills on beds four feet broad, at a foot distance, covering it in to the above depth. They are sometimes sown in other forms for the purpose of appearance.

The autumn sowings of these seeds should be marked by placing small sticks in the places, to prevent their being disturbed by the spring digging of the ground.

The only culture the plants in general require

after they appear, is that of thinning them in a proper manner, according to circumstances, and keeping them free from weeds. And in the perennial sorts removing the stems in the autumn.

These plants afford much ornament and variety in the different compartments of pleasure-grounds, and they succeed in most soils and situations, being of hardy growth.

DENTARIA, a genus affording plants of the herbaceous flowery hardy perennial kind. Tooth Violet.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianth: leaflets ovate-oblong, converging from parallel, obtuse, deciduous: the corolla is four-petalled cruciform: petals roundish, obtuse, scarce emarginate, flat, ending in claws the length of the calyx: the stamina consist of six subulate filaments, length of the calyx, of which two are shorter: anthers cordate-oblong, erect: the pistillum is an oblong germ, length of the stamens: style very short, thick: stigma obtuse, emarginate: the pericarpium is a long columnar silique, two-celled, two-valved, bursting open elastically with the valves rolled back: dissepiment a little longer than the valves: the seeds are many, and somewhat ovate.

The species chiefly cultivated are: 1. *D. pentaphylla*, Five-leaved Dentaria, or Tooth-wort; 2. *D. bulbifera*, Bulbiferous Dentaria, or Coral-wort.

Other species may be cultivated.

The first rises with a strong stalk a foot and half high, with a leaf at each joint, composed of five lobes, four inches long, and near two broad in the widest part, ending in acute points, and deeply serrate; they are smooth, and stand on long footstalks; the flowers grow in loose spikes at the top of the stalks, are small, and of a bluish colour. It is a native of Switzerland, &c.

The second species has a perennial root: the stem is simple, a foot in height; the lower leaves have three pairs of leaflets, and an odd one which is confluent with the pair below it; they are bluntly lanceolate and serrate; the leaves above these have five leaflets, and the upper leaves are trifid or simple, acutely lanceolate, serrate: the flowers are in clusters on the tops of the stalks, and flesh-coloured or purple. The scaly bulbs in the axils of the upper leaves, falling off, take root, and propagate new plants; so that it rarely produces seed. It is a native of Sweden, flowering in April and May.

Culture.—The propagation in these plants is effected by sowing the seeds in a light sandy soil where the situation is shaded, either in the au-

turn as soon as they are perfectly ripened, or in the early spring. The former is the better season where the soils are sufficiently dry. They are also capable of being increased by parting the roots, and planting them out, where there is a due degree of moisture and shade, in the autumn or spring; and in the latter sort they may be raised by planting the bulbs produced on the sides of the stems.

The only culture the plants stand in need of afterwards is that of keeping them clean from weeds, and in the first method removing such plants as may be too much crowded, to proper situations in the spring. They mostly flower and produce seeds in the second year's growth.

These plants are well adapted to the borders and other parts of shady walks and other similar compartments, where they grow well, and have an ornamental effect.

DIANTHUS, a genus furnishing plants of the herbaceous flowery ornamental kind.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Caryophyllei*.

The characters are: that the calyx is a cylindric perianthium, tubular, striated, permanent, five-toothed at the mouth, surrounded at the base with four scales, of which the two opposite are lower: the corolla has five petals, claws length of the calyx, narrow, inserted into the receptacle: border flat; the plaits outwardly wider, obtuse, crenate: the stamina consist of ten subulate filaments, length of the calyx, with spreading tips: anthers oval-oblong, compressed, incumbent: the pistillum is an oval germ: styles two, subulate, longer than the stamens: stigmas bent back, acuminate: the pericarpium is a cylindric capsule, covered, one-celled, gaping open at top four ways: the seeds a great many, compressed, roundish: receptacle free, four-cornered, shorter by half than the pericarpium.

The species chiefly cultivated in the garden are: 1. *D. barbatus*, Sweet William, or Bearded Pink; 2. *D. caryophyllus*, Clove Pink, or Clove Gilliflower; 3. *D. deltoides*, Common or Madder Pink; 4. *D. plumarius*, Feathered Pink; 5. *D. cæsius*, Gray-leaved or Mountain Pink; 6. *D. Chinensis*, China Pink; 7. *D. superbus*, Superb Pink.

The first has a perennial fusiform root: the stems are upright, jointed, smooth, a foot and half high, branched: the leaves, soft, veined, connate, from half an inch to almost an inch broad in the widest part, bright green; the bundles of flowers compact, umbelled, and sessile. These are of different colours, in different varieties. It is a native of Germany.

The principal varieties are: the Broad-leaved,

or Sweet-Williams: the Narrow-leaved, or Sweet-Johns; with single and double flowers in each.

The chief of the sub-varieties in the first or *broad-leaved* kind are, with broad leaves and tall deep red flowers, with tall flesh-coloured flowers, with pure white flowers, with white dotted flowers, with striped leaves and red flowers, large double rose-coloured with sweet-scented flowers, large double with deep purple burster flowers, and with double variegated flowers.

In the second, or *narrow-leaved* sort, with narrow leaves and deep red flowers, with pale red flowers, with pale red and flesh-coloured flowers, with purplish white-eyed flowers, with snow-white flowers, with white and flesh-coloured flowers, with white and purple flowers, with white spotted flowers, and with red flowers and white borders, or Painted Lady Sweet-Williams.

It is observed by Martyn, that the broad-leaved sort, with very double flowers of a deep purple, inclining to blue, bursting the calyx, is not so much esteemed; but that the double Rose Sweet-William, with flowers of a fine deep rose-colour, and smelling sweet, is much valued, as it does not burst. The Mule, or Fairchild's Sweet-William, which is one of the narrow-leaved double sorts, supposed to have been produced from seeds of a Carnation impregnated by a Sweet-William; the flowers are of a brighter red than in either of the former; their bunches not quite so large, but the flowers have an agreeable smell. The narrow-leaved kind are in general the most productive of double flowers.

The second sort, in its natural state, has the root large, woody, and branched: the stems a foot or eighteen inches high, decumbent at bottom, jointed and branched: the leaves are glaucous, smooth, linear, a line in breadth: every branch is terminated by one, two, or three flowers. These flowers, in the improved garden plant, have a spicy odour.

There are both single and double varieties, with reddish flowers, with variegated red and white flowers, with variegated red, white, and purple flowers, with variegated red, scarlet, purple, and white flowers, and with variegated red or purple above and white underneath.

The Carnations are distinguished by modern florists, from the difference of variegation, into four classes:—as *Flakes*, having two colours only, and their stripes large, going quite through the leaves. *Bizarres*, with flowers striped or variegated with three or four different colours, in irregular spots and stripes. *Piquettes*, having a white ground, spotted or pounced with

scarlet, red, purple, or other colours. *Painted Ladies*, with the petals of a red or purple colour on the upper side, and entirely white underneath.

Each of these classes have numerous sub-varieties, especially the third, which was formerly in most esteem with florists; but of late years the *Flakes* have been in greater request. It is useless however to enumerate their sub-varieties, as they are not by any means permanent.

The properties of a good Carnation are thus stated by florists:—The stem of the flower should be straight, strong, and able to support the weight of the flower without hanging down: the flower at least not less than from thirty to forty-five inches high: the petals well formed, long, broad, stiff, and pretty easy to expand, or, as the florists term it, make free flowers, being neither too close nor too thin; the middle of the flower not advanced too high above the other parts; the colours bright, and equally marked all over the flower: the flower very full of petals, so as to render it, when blown, very thick in the middle, with the outside perfectly round. And Martyn adds, “that the lower or outer circle of petals, commonly called the guard leaves, should be particularly substantial; should rise perpendicularly about half an inch above the calyx, and then turn off gracefully in a horizontal direction, supporting the interior petals, which should decrease gradually in size as they approach the centre, which should be well filled with them. All the petals should be regularly disposed, and lie over each other in such a manner as that their respective and united beauties may meet the eye all together; they should be nearly flat, or at most have a small degree of inflection at the broad end; their edges perfectly entire, without notch, fringe, or indenture. The calyx should be at least an inch in length, sufficiently strong at top to keep the bases of the petals in a close and circular body: the colours distinct, and the stripes regular, narrowing gradually to the claw of the petal, and there ending in a fine point. Almost one half of each petal should be of a clear white, free from spots.”

These properties are, however, chiefly expected in the fine potted varieties, which on coming into blow are usually placed together upon a stand or stage considerably raised and covered, in order to produce the fullest effect, and by protecting them to continue longer in beauty.

The double varieties, as being more large and beautiful in their colours, should be principally cultivated. Some of them, especially the *Bursters*, are extremely large, as three or four inches in diameter over the crown.

Whole Blowers and *Bursters* are common to

most of the varieties, especially the *Flakes* and *Bizarres*; the former are those in which the calyx or outer cup is long and of equal growth, opening regularly each way only at top, to admit a free and equal expansion of the petals all round: the flowers in these, though somewhat smaller, are more equally expanded, and require less trouble in the management of their bloom than in the *Bursters*. The latter are those in which the cup is large, and as it were swollen, being liable to burst on one side, and permit the petal to break out and produce irregular flowers, if care be not taken to prevent it by tying, and opening the calyx a little on the opposite side. The *Whole Blowers* are on this account the more convenient for culture, where much time cannot be spared in attending to the flowers.

The third species has numerous barren stems, reclining, and putting forth roots, the flowering stems from six to eight inches high, columnar below, square at top, slender, weak, but usually erect, sometimes simple, sometimes branched or dichotomous, swollen at the joints, slightly pubescent: the leaves are in pairs at each joint, linear or subulate, nearly the length of the internode, converging to the stalk, and embracing it at the base, slightly pubescent; those of the barren branches narrower: the peduncles are round, downy, from the ends of the stem and branches, single, or two from the same joint, each bearing one flower: the petals are toothed at the edge, bright red above, pale beneath; but according to Ray reddish, with a ring of deeper-coloured dots surrounding the eye; with dark purplish teeth near the throat, and beset with white silvery points; with hairs proceeding from them: the petals vary much in colour, being sometimes of a very pale flesh colour, sometimes deep red, but always marked with a ring of deeper red dots near the centre of the flower. It is a native of Sweden, &c.

There is a cultivated variety in gardens with white flowers, with a beautiful purple ring, and leaves rather more glaucous than in the common sort.

The fourth species has the stems ascending, a foot or eighteen inches in height, and branched: the leaves of a grayish or glaucous hue, a line and half wide, very sharp at the end: the flowers one, two, seldom three, at the ends of the branches, and sweet-scented; the calyx is of a glaucous-green, longer than in the other species: the petals large, light red or bright purple, sometimes white, with a circle of red; deeply jagged, having a red down at the base of the lamina or border. It is a native of Europe; flowering from June to August, and is perennial.

The fifth, according to Dr. Smith, has a woody root: the stalks several, a span high, erect, simple, smooth, quadrangular, having two or three pairs of leaves on them, one-flowered, scarcely ever two-flowered: the leaves are linear-lanceolate, bluntish, glaucous: the scales of the calyx only one third of the length of the tube, ovate-roundish, bluntly mucronate and striated: the petals are flesh-coloured, with a double row of blunt notches, marked with lines, and bearded at the base. It is a native of Switzerland.

In the sixth, the flower-stems are from six to eight or nine inches high, branching out on every side; the branches grow erect, and are terminated each by one flower: the flowers have no scent, but, having a great variety of colours, they are a considerable ornament to the flower-garden from July until the autumn: they have been greatly improved by culture; some flowers being as full of petals as the best double Pinks, and display the most glowing and vivid red colours. It is a native of China.

Martyn observes, that the roots often last two years in a dry soil; but they are generally raised from seeds annually. In the nursery-grounds it is generally known by the name of Indian Pink. Dr. Smith mentions having had a plant from Mr. Sikes's, which seemed to be a mule between this and the first species.

There are varieties with red flowers, with purple flowers, with white flowers, with variegated flowers, each single and double, and imperial large-flowered.

The seventh species has the stem a foot or eighteen inches in height, procumbent at the base, and then erect, round, somewhat two-edged on the upper part, smooth, branching only at top: the leaves are like those of narrow-leaved Sweet-William, connate, lanceolate-linear or linear subulate, acute, quite entire, bright green, smooth, marked with lines and a rising nerve, rough on the edge, green not glaucous: the flowers are erect, usually two terminating each branch, on short peduncles; sometimes there are more, and sometimes only one: petals pale red, sometimes white, sprinkled with bloody spots: they smell very sweet, especially in the evening. It is supposed by some perennial, but by others biennial, or annual. It succeeds best in a calcareous soil. It is a native of Denmark, &c. flowering in July and the following month.

The varieties of pinks principally cultivated in the garden are as below, flowering in the following order.

The *Damask Pink*, which is the first of the double sorts in flower; it has but a short stalk; the flower is not very large, nor so double as in many others; the colour is of a pale purple, inclining to red. It is very sweet in its smell.

The *White Shock*, which is thus denominated from the whiteness of its flowers, and the borders of the petals being much jagged and fringed: the flower-stalks are eight or ten inches in height. Its scent is not so agreeable as in some other sorts.

The *Pheasant's Eye*, of which there are different varieties, and frequently new ones introduced, some of which have very large double flowers; those which burst their pods are the least esteemed. They have firm flower-stems, eight or ten inches high: the flowers large, whitish, or blush-coloured, with dark purple spots in the middle. That sort of Pheasant's Eye called *Bat's Pink* often flowers again in autumn.

The *Col Pink*, the stalks of which are much taller than in those of the former sorts; twelve or fifteen inches high; the flowers very double, and of a bright red colour; it has the most agreeable odour of all the sorts; flowering from the latter end of May to the middle of July.

The *Old Man's Head Pink*, and the *Painted Lady*, flower in July, at the same time with the *Carnation*, to which they are more nearly allied than to the *Pink*. The first, when in its proper colours, is purple and white striped and spotted, but it is frequently of one plain colour, as purple: it continues flowering till the frost in autumn puts a stop to it, and the flower having an agreeable scent renders it valuable. The latter is chiefly admired for the liveliness of its colour; as it is not so sweet, or of so long continuance, as the other.

The *Clove Pink* has a large deep red flower, affording a strong scent of the *Clove*.

Martyn thinks it probable that the *Red Pinks* take their rise from the *Carnation*, whilst the *Pheasant's Eye Pinks* seem to derive their origin from the fourth. Some give them all as variations of the third; which is not, he conceives, likely.

There are single and double flowers of each of these sorts.

Culture.—Though the culture in these ornamental plants is effected without much difficulty, considerable attention is necessary in the management of some of the sorts, to have them flower in the utmost perfection and beauty.

Culture in the Sweet-William Kind.—The single sorts of these plants are readily increased by sowing seed which has been carefully collected in a bed of light earth, that has not been much enriched by manure, in the latter end of March or beginning of the following month, either over the surface or in slight drills, covering it in well: when the plants have attained a proper growth, as about the latter end of June, they should be removed and set out on other

small beds prepared for them, planting them out six or eight inches distant each way, watering them and keeping them perfectly free from weeds till the following autumn or spring, when they must be taken up with good balls of earth about their roots, and set out where they are to flower. It is by this method that new varieties are produced. Although these plants are perennial, they should be raised every year from seed, to have them blow strong and in perfection.

These and the double sorts may be continued by slips or layers. In the former mode the slips should be planted out either in the early autumn or spring months where they are to remain, giving them a little water at the time, when the weather is dry. When the slips are taken from the young plants, they should be made quite down to the roots, so as to have fibres to them. In this way the plants are often good and flower well. Cuttings or pipings managed in the same way also succeed well.

In the latter method the more tender branches should be laid down in the summer months, water being frequently given when the weather is hot and dry. After they have taken root perfectly they should be separated or taken off, and planted out where they are to remain, or in beds of light earth, to be afterwards removed, a little water being given at the time. A few of the best should be potted in the beginning of autumn, in order to be more conveniently removed under shelter during the severity of winter.

These plants should neither be kept too moist or dry, as in both situations they are liable to sustain much injury by the canker.

The seed for the culture of these plants should be collected, when perfectly ripened, from the best and most perfect flowers which have grown at a distance from any bad or inferior plants, and be kept in a dry situation.

Culture in the Gilliflower or Carnation Kind.—These plants may be raised with facility in the beds or borders of pleasure-grounds or gardens where the soil is moderately light and dry; but in order to have them in the greatest superiority and perfection, it is the practice of florists to employ a compost prepared by mixing the surface vegetable mould of old pastures with well rotted stable-dung from old hot-beds, or neat's dung in the same state and sea-sand, in the proportion of a third of the former and a fourth of the latter. These materials should be well blended, and lie for a considerable length of time, being frequently turned before they are made use of. This mould may be employed both for filling the pots with and for forming the beds; and in preparing it for these purposes it should not be sifted fine, but merely well broken down and reduced by the spade.

These flowers may be increased and new ones produced by seeds, which should be sown on beds formed of the above compost, or on the common borders of light fine mould, from about the middle of March to the same period in the following month, raking it in evenly to the depth of a quarter of an inch, giving slight waterings when necessary, to promote their vegetation. The fine sorts are likewise often sown in pots or boxes, in order that they may be readily placed so as to have only the morning sun when the season is hot and dry.

After the plants are come up they should be kept clear from weeds, and be watered occasionally, and about July, when the weather is moist, be taken up and pricked out in nursery-rows on beds three feet in width, setting them six inches distant, and watering them well at the time and afterwards till they have taken fresh root.

At the beginning of autumn, as about September, they will have attained a large growth, and require to be removed into other beds or situations for flowering, in which they should be set out in rows eight or nine inches distant each way. Some place them in the quincunx manner, as producing a better effect. In this situation they should be protected in severe weather during the winter by the application of mats upon hoops placed over the beds. The culture they require in these beds is merely that of keeping them free from weeds, occasionally stirring the earth between them by a hoe, and as their flower-stalks advance giving them the support of handsome sticks. They should remain in these situations till they flower, after which the singles should be taken out and made use of as there may be occasion, in order to afford full room for the double sorts, the finest and most perfect of which being made stage or principal flowers, and the others set out in the borders; the whole being increased as there may be necessity by layering both the first and succeeding years.

The layer method is that which is principally employed in increasing and continuing particular varieties; as being the most certain. For this purpose the radical leafy shoots proceeding from the crowns of the plants, when of six or eight inches growth, are the most proper. These should be laid down into the earth about the latter end of June or beginning of the following month. The work is performed by stripping off the leaves from the lower part of the shoot, cutting off a little of the top, and then fixing upon a strong joint about the middle, to slit it with a sharp knife nearly half way through in a slanting manner, so as nearly to reach the joint above, forming a sort of tongue on the under side of the shoot, removing the bark from the enlarged part or joint to promote the striking

root. The mould about the root of the plant should then be stirred, and fresh added where it is wanting, forming a slight drill or opening for the branch to be gently laid down into in a horizontal manner with the cut part in the earth, the top being left out and raised a little to keep the slit open, pegging the main part of the branch down by short hooked sticks, drawing the earth over the cut part. When this method has been practised on all the branches, a good watering should be given to settle the mould about them, and frequently repeated when the season is dry.

When the layers thus formed have stricken good roots, which is mostly the case in six or eight weeks, they should be taken off with the root-fibres as entire as possible, and after having the sticky parts about the bottom and the top leaves trimmed off, be planted out either in pots or beds, in the latter method at six or eight inches distance, with a dibble, a good watering being immediately given, and repeated every two days for ten days or a fortnight till the plants become well rooted. They should be removed from these beds with balls of earth about their roots in the beginning of the autumn into small pots, to have shelter during the winter, and in the early spring be placed in large ones for flowering; but when there is room, it is a better practice to plant them at once in the pots, as frequent transplanting injures their growth. Some florists, however, think it beneficial.

The less fine sorts may at the above season be planted out in the clumps, borders, or other parts, or be left in the beds for flowering.

These flowers may likewise be increased by cuttings or pipings in the manner directed below in raising pinks.

In the winter management of the plants, the fine potted sorts should about November be removed under the protection of a deep frame covered with glasses, and plunged closely together in a slight bed of old tan, dry sand, or earth. In this situation they should have a free admission of air when the weather is mild, but be covered in frost, and care should be taken that there be no stagnation of moisture, by the holes in the bottoms of the pots being obstructed.

The flowers in the beds should be covered by mats or other contrivances when the weather is severe at the same season.

In the spring their culture should be continued by removing those fine varieties planted out in small pots in the autumn into large ones for flowering, and such as have remained in the nursery-beds into the borders or large pots nine or ten inches over at top, to afford flowers, in each of which the business should be done by preserving balls of earth about their roots, about

the beginning of March or the following month. The work is performed by closing the holes in the bottoms of the pots with pieces of oyster shells or tiles, then filling them half way up with the earth prepared as above, placing the plants with their balls of earth in them, and filling up the vacancies on the sides with more fresh mould, closing it well up about the bodies of the plants so as they may stand nearly as high as the tops of the pots, giving a good watering at the time.

When the plants have been thus potted they should be placed in a sheltered sunny situation in the open air, being frequently refreshed with water in hot dry weather.

It is the practice with some florists to plant two flowers in a large pot; but it is better as well as more convenient for layering only to have one, the plants flowering stronger and making more free shoots.

In the summer treatment of the flowers the care of frequent watering should be continued when the weather is hot and droughty, and the surface mould be occasionally stirred to promote the growth and preserve neatness; and when the flower-stalks are a little advanced, handsome painted sticks should be placed for their support both in the pots and other situations, to which they should be neatly tied as they proceed in their growth. When they approach the period of flowering, the curious sorts should be removed to a stage constructed for the purpose, and provided with an awning to protect them from being injured by the scorching heat of the sun in the middle of the day, and the effects of too much wet, by which they are continued much longer in beauty.

Stages of this nature are formed in different methods, according to the fancy of the persons who make use of them. The following is a neat mode of constructing such apparatus: a platform is erected at the height of eighteen inches or two feet, constituted of two ranges of planks, in order to contain two rows of pots, sustained by posts in one or two rows underneath with an open-work roof five or six feet in height, covered by means of painted canvass, or some other suitable material, the whole being supported by upright posts, according to the taste of the proprietor.

The body of the stage should be neatly painted for the purpose of effect as well as preservation.

Instead of these stages some make use of a sort of caps or umbrellas formed of tin or other materials, supported on stems or sticks, one for each plant; but these are neither so convenient nor afford so good an effect as the former in displaying the beauties of the flowers.

But whatever contrivances are made use of for the protection and display of these curious flowers, the tying of the plants to the support-sticks should be continued as the stems advance; and some curious florists contrive to keep them erect at the tops by the use of fine wire or other similar means. And in order to procure the flowers as large and fine as possible, they trim off all the side-shoots from the stems, leaving only one or two of the top flower-buds to expand. When the flowers begin to open, care should be taken to prevent their bursting and expanding in an irregular manner, especially in the *burstlers*, by making a little opening or two in the indentings at the top at equal distances in other places, by means of fine small pointed scissors. The regular expansion of the flowers may likewise be much assisted, especially where one side is more expanded than the other, and they are in pots, by turning the pots, that the contrary sides may have the full influence of the sun.

Some florists likewise, to blow the curious sorts as broad and fine as possible, make use of a kind of spreading, stiff, white paper collar, cut open on one side and placed round the bottoms of the flowers to expand the petals upon to the utmost extent; but the practice is not in general advisable.

As these plants flower less perfectly as they increase in age, it is proper to provide fresh supplies of new varieties of them annually by sowing seed obtained from the best sorts in the spring season, as directed above, and likewise to continue the most valuable double varieties by means of layering in the summer months every year, or the planting of cuttings or pipings, but the first is by much the best mode.

In order to have good seed, some plants of the best and most curious sorts should be preserved distinct, and suffered to flower and ripen their seed in a perfect manner, which should then be taken off in the pods when the weather is dry, and, after being hardened a little, rubbed out and put up in a bag to be placed in a dry situation.

Culture in the Pink Kind.—All the species and varieties of these plants may be increased from seeds, and the perennial sorts likewise by layers, slips, cuttings, and pipings.

Where the best sorts only are grown, great care should be taken, in providing the seed, that it be always had from the best and most perfect kinds.

It should be sown in the manner directed for Carnations, in the beginning of March or the following month, and the plants be managed in a similar manner, only, as being more hardy in their nature, with less tenderness.

The sixth species is best increased by sowing the seed on a very gentle hot-bed the beginning of April, as the vegetation is thereby much for-

warded. When the plants appear air should be admitted freely, to prevent their drawing up weak, and when of a little growth they may be pricked out with good roots, if the weather be suitable, on a bed of light earth, at about three inches distance, proper shade and water being given. When they are of considerable growth, as about the latter end of May, they should be removed with good balls of earth about their roots, and planted where they are to remain for flowering.

The layers should be laid down in the latter end of July or beginning of the following month, in exactly the same manner as has been directed for Carnations, giving them the same culture in every respect.

Where there are large plants that spread considerably in a lateral manner, their shoots may be covered with earth in the spring to the depth of an inch or two; they will thus often take root, form good plants, and be in a state to be planted out in the beginning of the autumn.

The slips of the young shoots either made from the sides of the principal ones or from the roots, so as to have fibres to them, and planted out in February or the two following months in beds of good mould to a good depth, readily take root and become good plants before the end of the summer; at which time, or in the following spring, they may be removed with good balls of earth about their roots, to the places where they are to flower.

Cuttings made from the firm shoots of the same year at the joints, to the length of three or four inches, when planted pretty deeply in a bed of very fine mould, or in large pots at the distance of an inch or two, and well watered at the time, readily grow and become plants after being transplanted into separate pots, or the borders where they are to flower.

Pipings made by drawing out or breaking off the top parts of the young shoots at the joints and trimming them, by which a sort of pipe is formed, on being planted and managed in the same manner, take root and afford plants. See **PIPING FLOWERS**.

In both these last methods the rooting of the shoots is greatly promoted by their being closely covered by bell, hand, or other sorts of glasses, and having frequent slight waterings given round the sides of them.

The seed of the different best sorts should be collected in the pods in August or the following month when perfectly ripened, choosing a dry season for the purpose, spreading them out to harden and become dry on paper or in some other manner, after which it should be rubbed out and kept in some dry situation till it is wanted.

All the different species and varieties of these

plants are highly ornamental, and many of them curious, affording an extremely fragrant smell.

The first sort in all the varieties may be made use of in the borders, clumps, and other places, where they produce a fine effect by the variety of their flowers in assemblage with others of similar growth.

A few of the double more curious kinds may also be cultivated in pots for adorning the more conspicuous places about the house.

The second species and all the different varieties of the Carnation kind are proper ornamental plants for the fronts of clumps, borders, and other principal parts of gardens or ornamented grounds, where they have a very agreeable effect from the beauty and elegance of their flowers, as well as the fragrance which they afford.

The curious double sorts are mostly cultivated in pots for the convenience of protection, and being exhibited on stages or in particular situations during the time of their blowing, as well as for the ease and facility of removal when necessary.

The third sort and the different varieties of the common pink are well adapted for producing ornament in the fore parts of beds, borders, and other compartments of pleasure-grounds and gardens, both from the multiplicity of their flowers and their beauty, as well as fragrant smell. These are sometimes used for edgings, but from their spreading growth they require frequent cutting in.

The fourth and fifth sorts may likewise be employed for the purpose of affording a greater variety.

The sixth species is very ornamental from the fineness of the colour of the flowers, and the great length of time which they continue in bloom.

It is observed by Martyn that the seventh species, from the elegance and delicious fragrance of its flowers, is deserving of being employed in all curious gardens.

In the planting out the various sorts, the annual kinds are mostly disposed in patches of three or four plants in each; but the perennial kinds singly, as being more bushy and spreading in their growth.

All the several species and varieties of these flowery plants may be brought to blow much more early by being cultivated in frames or the hot-house.

DIBBLE, an implement used for planting out various kinds of seeds, young plants, &c.

The best sorts are those made of the trees or handles of old spades, having the heads or top handles entire, twelve or fifteen inches, with the shank made gradually tapering to a point at the

lower end; and to make them more complete, they should be shod with a thin socket of iron seven or eight inches in length, made tapering to a point at bottom, as iron-shod dibbles make the holes much easier, cleaner, and more expeditiously than those wholly of wood, which are apt to clog with earth, and retard the business of planting.

These implements are proper for planting out most sorts of young plants, especially the fibrous-rooted kinds, and different sorts of cuttings, &c.

Besides these, blunt-pointed ones for planting large kinds of seeds and bulbous roots, such as broad beans, potatoes, large kinds of nuts, &c. and the bulbs of crocus, narcissus, tulips, and other bulbous roots, are necessary; which, by being rounded at the end, make the holes so as to admit them to the bottom; whereas the narrow-pointed ones form the holes deeper than is requisite, so as to leave a vacancy under the seed or root, in which water may stagnate and do injury, especially in winter: besides, when the seeds or roots go clean to the bottom, the growth of the plants is more effectually promoted. This implement in some places is termed *Dibler*.

DICTAMNUS, a genus affording a plant of the herbaceous hardy flowering perennial kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that the calyx is a five-leaved perianthium, very small, deciduous: leaflets oblong, acuminate: the corolla has five petals, oval-lanceolate, acuminate, with claws, unequal; of which two are bent upwards; two placed obliquely at the sides; one bent downwards: the stamina consist of ten subulate filaments, length of the corolla, situated between the two lateral declining petals, unequal; small point-like glands scattered over the filaments: anthers four-sided, rising upwards: the pistilum is a five-cornered germ, elevated from the receptacle: style simple, short, bent downwards, incurved: stigma sharp, rising upwards: the pericarpium has five capsules, conjoined inwardly at the border, compressed, acuminate, with distant tips, two-valved: the seeds in pairs, ovate, very smooth, within a common aril, which is two-valved, and cut down.

The species cultivated is *D. albus*, *Fraxinella*, or White Dittany.

It has a perennial root, striking deep into the ground, and the head annually increasing in size: the stalks many, two or three feet high, round, here and there slightly grooved, sometimes subcapitular, not branched, at bottom green and beset with white hairs, ferruginous-

red towards the top, with resinous glands: the leaves are alternate, the larger above a foot in length, spreading out horizontally, ascending towards the end; the midrib flat at top and edged on both sides, convex beneath and hairy; leaflets from two to five pairs, with an odd one at the end, most of them alternate, except the top pair or two, sessile or subsessile, except the end one, which is on a long winged petiole, smooth, stiff, oblique except the end one, ovate, acute, serrate, shining on both sides, about two inches long and an inch wide; the whole somewhat resembling an Ash leaf. The flowers in a long pyramidal loose spike or raceme, nine or ten inches long, of a purplish colour: the branches of the raceme alternate, with a bracte at the foot of each, one or two-flowered; there is also a short, lanceolate, hairy bracte to each pedicel. To each flower succeeds a fruit consisting of five compressed capsules, spreading out like the points of a star.

The whole plant, especially when gently rubbed, emits an odour like that of lemon-peel, but when bruised it has something of a balsamic scent. It is a native of Germany, flowering here at the end of May.

There are varieties with white flowers, with red and purple striped, and with short spikes of flowers.

Culture.—These plants may be increased by sowing the seeds in the beds, borders, or other parts of pleasure-grounds or gardens where the plants are to remain, in the beginning of the autumn soon after they become ripe, or in the spring; but the former is the best season, as the plants rise stronger and with more certainty. The plants should afterwards be kept perfectly clear from weeds, and have their stems cut down and cleared away every year in the autumn, as well as the earth dug round them in the early spring. Some, however, advise the roots of the plants in the first autumn to be taken up and planted out in small beds at six or eight inches distance each way, to stand two or three years till they are strong enough to flower, when they are to be carefully taken up in the autumn, and placed where they are to remain. They continue for a great length of time, and require little culture except that of being kept free from weeds, and trimmed as above in the autumn.

They are plants well suited to the middle parts of beds, borders, clumps, and other parts of ornamented grounds.

DIGGING, the operation by which garden ground is rendered fit for the reception of various sorts of crops. It should always be performed as near the time of putting in the seeds as possible, as in this state a new sort of fer-

mentation takes place, by which heat is not only evolved, but various other substances necessary for the purpose of healthy vegetation provided. But where the object is chiefly that of producing a fine mellowness in the mould, it may be performed at suitable leisure times in the autumn, being ridged or laid up so as to be exposed to the full influence of the winter frosts, and be in a proper condition for being levelled down and sown or planted upon in the early spring.

In bringing garden land into a suitable state for the reception of crops, it is an useful practice in some cases, especially where the sub-soil is of a good rich quality, to have it trenched over, paring off the surface, and turning it to the bottom, to be covered by the earth from below; but this should never be attempted except for tap-rooted crops, where the under soil is of a sterile unfriendly nature, as by such means the bed for the immediate reception of the seeds or plants must become very unfriendly to their growth, while the rich surface vegetable material will be placed out of their reach, and lost. This sort of work may be performed either in the autumn or spring months; but in the more heavy, adhesive soils it should always be performed when the weather is dry, as under other circumstances the mould is liable to become lumpy and uneven, and of course unfit for the putting in of crops.

In the execution of the first mode, or that of plain digging, the workman proceeds by beginning at one end of the piece of ground, forming a trench or opening quite across, to the depth which may be considered necessary, as from half a spit to a spit, according to the crop to be put in, and the same width, conveying the earth taken out to the opposite end, where the work is to finish; then proceeding with a second course across as before, turning the different spits in a clean, neat, even manner, into the former opening, continuing the same regular courses till the whole is dug over, breaking and reducing the lumps and clods as much as possible, being careful to preserve a level even surface, having a due regard to any hollows or depressions that may be present. The earth taken out from the first opening or trench will serve to fill up and render the last even and level; and when dung is applied, it may either be spread evenly over the surface, and regularly turned in, or placed in the hollow or trench, and covered by the digging of the following trench. This is much the best practice where the dung is of a rather littery nature. As the work advances, the roots of perennial weeds, such as twitch, bear-bind, and others of the same sort,

should be carefully picked out, as they multiply fast by being divided; and the surface-ones be well turned to the bottom.

In the latter, or trench method of digging, the usual practice is to begin at one end of the piece of ground, and form or open by a line and the spade a trench two spits wide, to the depth of one or two, removing the earth taken out to the contrary end, for the purpose of filling up the last trench; then to form a second trench in the same manner, after having pared off the surface, and placed it in the bottom of the former; proceeding in the same way till the whole is trenched over. In this mode it is usual to shovel up and take out the reduced mould or crumbs from the bottoms of the trenches in each course of digging. In executing the labour in this sort of digging, the workman stands with his side to the trench, while in the former case he faces it. This practice is particularly useful where the ground is much infested with weeds, and where the soil is stiff, or not of great depth. The dung in this way of digging, where it is made to the depth of only one spit, may be put in the bottom; but when two spades' depth are employed, it should be put in upon the first spit, after it has been dug off and placed in the bottom of the former trench or opening, as by this means it will not be buried to too great a depth, which would otherwise be the case.

The trench digging of garden ground may be performed either in a level surface, as in common digging, or in rough ridges: the first is the best method when immediate sowing is intended; but the latter in general where the land is to remain some time before it receives the crop, as in this way it will derive the greatest advantage from the influence of the atmosphere, and be more fully reduced, and rendered fine in the mould by being levelled down, when the sowing or planting is to be performed. But where the soils are of a thin, gravelly, or sandy nature, as they are liable to part with their moisture too freely, and do not stand much in need of pulverization, it would seem the best practice to constantly dig them in a plain or level surface, as by such means the effects of evaporation will be most effectually guarded against.

In general, all sorts of digging and levelling down, especially in the stiffer sorts of soil, should be executed when the ground is in a state somewhat inclining to dryness, as it can never be done to advantage when in a very moist or cloggy condition.

DIGITALIS, a genus comprising plants of the herbaceous hardy flowering biennial and perennial kinds,

corners is a cell (cocculus), containing one smooth, shining, oblong, black seed: these seed-vessels abound with resin, which afford a grateful scent, as does also the whole plant.

The third is a plant of humbler growth, seldom above three feet high, and spreads out into many branches; the leaves resembling those of heath: the flowers are in clusters at the ends of the branches, like those of the second sort, but smaller, and the bunches not so large, of a red colour.

The fourth is a low bushy shrub, which seldom rises above two feet high, but spreads out its branches far on every side: the leaves are narrow and smooth, of a light green colour, being ranged on each side the branches, appear flat on the upper and under side; when they are bruised, they emit a very strong penetrating odour: the flowers are produced singly from between the leaves; are white, and tinged on their upper surface. The Hottentots are said to use it to scent their ointments.

Culture.—These plants may be increased by planting the cuttings of the young shoots in the spring or summer months, in pots filled with good mould, plunging them in a moderate hot-bed. When the plants have stricken good root, they should be carefully taken up and placed out separately in pots, proper water and shade being given. They afterwards require to be protected in the green-house, and have the management of other shrubby exotic plants of similar growth.

These plants, from the beauty of their bloom and the fragrant smell that is emitted by many of them, are highly deserving of places in shrubby collections.

DIOSPYROS, a genus affording plants of the deciduous shrubby flowering exotic kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Bicornes*.

The characters are: that in the hermaphrodite female the calyx is a one-leafed, four-cleft perianthium, large, obtuse, permanent: the corolla one-petalled, pitcher-shaped, larger, four-cleft; divisions sharp, spreading: the stamina consist of eight filaments, bristle-form, short, almost inserted into the receptacle: anthers oblong, unproductive: the pistillum is a roundish germ: style single, half four-cleft, permanent, longer than the stamens: stigmas obtuse, two-cleft: the pericarpium is a globose berry, large, eight-celled, sitting on a very large spreading calyx: the seed solitary, roundish, compressed, and very hard: male in a distinct plant: the calyx is a one-leafed, four-cleft perianthium, sharp, upright, small: the corolla one-petalled, pitcher-shaped, leathery, four-corner-

ed, four-cleft: divisions roundish, rolled back: the stamina consist of eight filaments, very short, inserted into the receptacle: anthers double, long, sharp: the interior shorter: the pistillum a rudiment of a germ.

The species cultivated are: 1. *D. Lotus*, European Date Plum; 2. *D. Virginiana*, American Date Plum.

The first rises with a tree-like stem to the height of six feet; the smaller branches spread a little, and are yellowish: the leaves oval-lanceolate, large, quite entire, paler underneath, somewhat hoary, with the veins somewhat hairy: the flowers are small, reddish-white, rotate: the fruit the size of a cherry, yellow when ripe, sweet with astringency. It is a native of Europe.

The second species rises here to the height of from fourteen to sixteen feet, commonly dividing into many irregular trunks near the ground: the wood is very hard, but brittle and somewhat white: the branches are many, and grow slender to the end, covered with a very thin greenish bark: the leaves many, broad, green, without dent or notch on the edges, so like the former, that it seems at first to be the same: it has a dark brown bark on the branches, but on the twigs it is grayish: the fruit is in form and bigness like a Date, very firm as that fruit, almost as sweet; with a great flat thick large kernel within. It is a native of Virginia and Carolina.

Culture.—The method of propagation in these plants is by sowing the seeds in a warm situation in the open ground in the spring; but it is better when done in pots or boxes filled with good earth, and plunged into a moderate hot-bed, as they rise more quickly, and advance with greater rapidity. When the plants have attained some growth, they should be gradually exposed to the open air until the autumn, when those in the full ground should be carefully protected from frost by mats or other means, and those in pots placed under a garden frame on moderate heat; free air being admitted when the weather is mild. Early in the following spring, they should be removed, and planted out in a warm situation in the nursery at proper distances, to remain two or more years; when they will be fit to be finally put where they are to remain.

These plants are proper for the large clumps, borders, and other parts of shrubberies, being sufficiently hardy when of proper growth to resist the effects of frost; where they have a good effect, not only from their flowers, but the shining green appearance of their leaves.

DIRCA, a genus containing a plant of the low deciduous hardy exotic kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Vepruculæ*.

The characters are: that there is no calyx: the corolla one-petalled, club-shaped; tube bellying above: border obscure, with unequal margin: the stamina consist of eight capillary filaments, inserted into the middle of the tube, longer than the corolla: anthers roundish, upright: the pistillum is an ovate germ, with oblique tip: style filiform, longer than the stamens, crooked at the tip: stigma simple: the pericarpium is a one-celled berry: the seed single.

The species is *D. palustris*, Marsh Leatherwood.

It rises to the height of five or six feet in its native situation, but in Europe rarely more than half so high: it sends out many jointed branches near the root: the leaves are oval, pale yellowish, and smooth: the flowers come out from the side of the branches, two or three upon each peduncle; are of a greenish white colour, and appear early in the spring, when the leaves begin to shoot. It is a native of North America; flowering in March and the following month.

Culture.—This sort of plants is raised with difficulty in this climate, as they do not produce seeds, and can only be well effected by layers or cuttings of the young branches.

When the seeds can be procured from their native situation, they should be sown in the spring in a rather moist boggy situation, where the shrubs are to remain, as the plants never succeed where the soil is dry.

The layers or cuttings of the young shoots should be laid down or planted out in similar circumstances, during the spring and summer months; and when they have taken full root, be separated or removed, and planted in moist situations where they are to remain.

These plants can seldom be preserved, except in moist boggy places, in which they are rarely injured by cold.

DISANDRIA, a genus containing a plant of the trailing ornamental perennial kind.

It belongs to the class and order *Heptandria Monogynia*, and ranks in the natural order of *Pedicularæ*.

The characters are: that the calyx is a one-leaved perianthium, from five to eight-parted: divisions straightish; permanent: the corolla one-petalled, wheel-shaped: tube very short: border five-parted: divisions ovate: the stamina consist of from five to eight filaments, bristle-form, from erect becoming patulous, shorter than the corolla: anthers sagittate: the pistillum is an ovate germ: style filiform, length of the stamens: stigma simple: the pericarpium an ovate capsule,

length of the calyx, two-celled: seeds several, and ovate.

The species cultivated is *D. prostrata*, Trailing Disandra.

It has stems from a foot to two feet in height, prostrate, round, pubescent: the leaves are alternate, petioled, with about thirty notches, and pubescent: the peduncles axillary, usually two together, but sometimes one or three, erect, filiform, one-flowered, higher than the petioles: the flowers of a yellow colour. Martyn observes, "that the foliage greatly resembles that of Ground-ivy, and the branches trail on the ground somewhat in the same manner to the length of several feet." It is a native of Madeira; flowering most part of the summer.

Culture.—These plants may be easily increased by planting cuttings of the young shoots in pots filled with rich earth, which after they have taken root must be removed into separate pots, and be kept well watered during the hot season. They require the protection of the green-house during the winter, but in the summer they will bear the open air.

They produce an excellent effect when placed on high shelves, so that their branches may hang down over the sides of the pots in a loose manner.

DITTANY. See **DICTAMNUS**.

DODARTIA, a genus comprising a plant of the hardy perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a one-leaved perianthium, bell-form, five-toothed, with ten corners, tubular, nearly equal, flat, permanent: the corolla one-petalled, ringent: tube cylindric, bent downwards, much longer than the calyx: upper lip small, emarginate, ascending: lower lip spreading, wider, three-cleft, twice longer, obtuse; middle division narrower: the stamina consist of four filaments, ascending towards the upper lip, and shorter than it: anthers small, roundish, twin: the pistillum is a roundish germ: style subulate, length of the corolla: stigma compressed, oblong, obtuse, two-cleft, the lamellæ converging: the pericarpium a globose two-celled capsule: the seeds numerous, very small: receptacle convex, growing to the dissepiment.

The species cultivated is *D. orientalis*, Oriental Dodartia.

It has a perennial root, which creeps far under the surface, and sends out new stalks at a great distance from the parent plant; these are firm, a little compressed, and grow a foot and half high, putting out several side branches: the leaves are long, narrow, fleshy, opposite, of a

deep green colour; those on the lower part of the stalk shorter and broader than on the upper, on which they are entire; at these joints the flowers come out singly on each side the stalk, sitting close to it, are nearly an inch long, and of a deep purple colour; appearing in July. It is a native of the East; but rarely produces seeds here.

Culture.—These plants are readily increased by planting pieces of their creeping roots, either in the autumn, at the time when the stems decay, or in the spring before they shoot up; they succeed best in light dry soils.

It serves for ornamenting the borders and other parts of the garden or pleasure-ground.

DODECATHEON, a genus furnishing a plant of the low flowering perennial kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Precie*.

The characters are: that the calyx is a many-leaved, many-flowered involucre, very small: perianthium one-leaved, half five-cleft, permanent: divisions reflex, finally longer, permanent: the corolla one-petalled, five-parted: tube shorter than the calyx: (naked at the throat) border reflex: divisions very long, lanceolate: the stamens consist of five filaments, very short, obtuse, seated on the tube: anthers sagittate, converging into a beak: the pistillum is a conic germ: style filiform, longer than the stamens: stigma obtuse: the pericarpium is an oblong, one-celled capsule, gaping at the tip: (subcylindric, opening into five parts): the seeds very many, and small: receptacle free, small.

The only species is *D. Meadia*, Virginian Cowslip, or Meadia.

It has a yellow perennial root, from which come out in the spring several long smooth leaves, near six inches long, and two and a half broad; at first standing erect, but afterwards spreading on the ground, especially when much exposed to the sun: from among these leaves arise two, three, or four flower-stalks, in proportion to the strength of the roots, which rise eight or nine inches high, smooth, naked, and terminated by an umbel of flowers, which are purple, inclining to a peach-blossom colour. It is native of Virginia, flowering about the end of April or beginning of the following month.

Culture.—The methods of propagation in this plant are either by seeds, or off-sets from the roots; but the last is the best.

In the first, the seeds should be sown either in the autumn, soon after they are fully ripened, or in the spring, in a moist shady spot, or in pots to be placed in such situations. When the plants

appear, they should be kept free from weeds, and have occasional water when the weather is dry, being shaded from the heat of the sun. When the stems decay, they may be carefully removed and planted in moist shady places, at the distance of twelve or eighteen inches, to remain till the following autumn, when they should be finally planted in the borders and other places where there are due shade and moisture.

The roots may be removed, and the off-sets carefully taken off from them about the latter end of August or the following month, and immediately planted in such situations as the above, when they will be fully established before the frosts set in.

These plants are found to be hardy, but incapable of succeeding in dry soils or sunny situations. They afford ornament in the beds, borders, or other parts of pleasure-grounds.

DODONÆA, a genus comprehending plants of the shrubby exotic kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Dumosa*.

The characters are: that the calyx is a four-leaved, flat perianthium; leaflets ovate, obtuse, concave, deciduous: there is no corolla: the stamens consist of eight very short filaments: anthers oblong, bowed, converging, length of the calyx: the pistillum is a three-sided germ, length of the calyx: style cylindric, three-furrowed, upright: stigma slightly three-cleft, a little acute: the pericarpium a three-furrowed capsule, inflated, three-celled, with large membranaceous corners: the seed in couples, and roundish.

The species are: 1. *D. viscosa*, Broad-leaved Dodonæa; 2. *D. angustifolia*, Narrow-leaved Dodonæa.

The first sends up several stalks from the root, about the size of a man's arm, with several upright branches, covered with a light brown bark, which frequently separates from the wood, and hangs loose: the leaves are stiff, varying greatly in shape and size, some being four inches long, and an inch and a half broad; others not three inches long, and a quarter of an inch broad; they are spear-shaped, entire, and of a light green, growing with their points upward, and have very short foot-stalks. The flowers are produced at the end of the branches in a sort of raceme, each standing upon a slender foot-stalk about an inch long. It is a native of the countries between the tropics.

The second species resembles the first, but the leaves are lanceolate-linear, and the fructification polygamous. It is a native of the Cape, flowering from May till the latter end of summer.

Culture.—The propagation in these plants is effected by sowing the seeds obtained from abroad on a moderate hot-bed in the early spring. When the plants have attained a sufficient growth they should be removed into separate small pots filled with light loamy mould, and plunged into a bark hot-bed, due shade being given till they have stricken fresh root; after which, air should be admitted in proportion to the state of the weather, and slight portions of water. As the autumn approaches they should be placed in the stove, where there is only a moderate heat, and be sparingly supplied with water.

In the more advanced growth of the plants they may be placed abroad a few months in the summer season, in such situations as are warm and sheltered.

These plants afford variety among other stove plants, and were formerly supposed to be the tea-tree by some.

DOGBERRY-TREE. See CORNUS.

DOGWOOD. See CORNUS.

DORONICUM, a genus comprehending plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, with leaflets lance-subulate, about twenty in number, equal, upright, of a double series, length generally of the ray of the corolla: the corolla compound rayed: corollules hermaphrodite tubular, numerous, in the disk: females ligulate, of the number of calycular leaves, in the ray. Proper of the hermaphrodite funnel-form; border five-cleft, patulous: female ligulate, lanceolate, three-toothed: the stamina in the hermaphrodites have five capillary filaments, very short: anther cylindric, tubular: the pistillum in the hermaphrodites is an oblong germ: style filiform, length of the stamens: stigma emarginate: in the females, germ oblong: style filiform, length of the hermaphrodite: stigmas two, reflex: there is no pericarpium: calyx slightly converging: the seeds in the hermaphrodite solitary, obovate, furrowed, a little compressed: down hairy: in the females solitary, obovate, furrowed a little, and compressed: down none: the receptacle is naked and flat.

The species are: 1. *D. pardalianches*, Great Leopard's Bane; 2. *D. plantagineum*, Plantain-leaved Leopard's Bane; 3. *D. bellidiastrum*, Daisy-leaved Leopard's Bane.

The first has thick fleshy roots, divided into many knots, sending out strong fleshy fibres, which penetrate deep into the ground. The root-leaves are heart-shaped, hairy, petioled: among these arise the flower-stalks, which are

channelled and hairy, near three feet high, putting out one or two smaller stalks from the side; these grow erect, and have one or two heart-shaped leaves closely embracing the stalk; this and each branch is terminated by one large yellow flower. It is a native of France, &c. flowering in May.

In the second species the leaves are indented on their edges towards their base; their upper parts are entire. The stalks rise about two feet high; each is terminated by a large yellow flower, like that of the first sort: they have two or three alternate, embracing leaves, not so hairy as those of the first species. It is a native of Germany, &c. flowering at the same time with the first.

The third has also a perennial root. The leaves are like those of the common daisy, but longer, and not so broad. The flower grows on a naked stalk near a foot long, and the root seldom sends out more than one stalk. It is of a white and yellow colour, and a native of the Swiss Alps, flowering in April.

Culture.—The methods of increasing these plants are either by sowing the seeds, or planting offsets of their spreading roots, in the spring or autumn, in shady spots of ground, either where the plants are to remain, or, in the former case, to be afterwards removed to them when they have attained some inches growth. The last sort is best increased by parting the roots, and succeeds most perfectly when the soil is moist and the situation shady.

All the sorts are well suited to the large borders, clumps, and other parts of extensive pleasure-grounds.

DRACÆNA, a genus containing plants of the herbaceous and tree-like kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla has six petals, oblong, somewhat upright, equal, cohering by the claws: the stamina consist of six filaments, inserted into the claws, subulate, thicker in the middle, membranaceous at the base, length scarcely of the corolla: anthers oblong, incumbent: the pistillum is an ovate germ, six-striated: style filiform, length of the stamens: stigma three-cleft, obtuse: the pericarpium is an ovate berry, six-furrowed, three-celled: the seeds solitary, ovate-oblong, incurved at the tip.

The species are: 1. *D. Draco*, Dragon Tree; 2. *D. ferrea*, Purple Dracæna; 3. *D. ensifolia*, Sword-leaved Dracæna; 4. *D. marginata*, Aloe-leaved Dracæna; 5. *D. borealis*, Oval-leaved Dracæna.

The first in its native situation rises with a thick trunk nearly equal in size the whole length; the inner part very pithy, next to this a circle of strong fibres, and the outside soft; height twelve or fourteen feet, nearly of the same diameter the whole length, which is rarely more than eight or ten inches; circular marks or rings are left the whole length, where the leaves have fallen off. The top sustains a large head of these, coming out singly all round it; they are shaped like those of the common Iris, but are much longer, being often four or five feet in length, and an inch and half broad at their base, where they embrace the trunk, lessening gradually and terminating in a point: these leaves are pliable, and hang down; are entire, of a deep green, smooth on both surfaces. It is a native of the East Indies, and called Dragon Tree, from the inspissated juice becoming a red powder, like the eastern Dragon's blood.

The second species has a shrubby stem, almost simple, eight feet high, erect, round, with close protuberant rings from the fallen leaves; these are quite entire, a foot and half in length, erect, smooth, on stem-clasping petioles, and of a dusky-red colour. The flowers are of a red-purple colour. It is a native of China, flowering in March and the following month.

The third has a perennial root, horizontal, creeping, somewhat woody, odoriferous, and simple. The root-leaves are heaped, thick, striated, shining, reflex, sword-shaped, a foot long. The scape three feet high, leafy at bottom, naked at top, round, slender, and declining; the flowers terminating, sub-umbelled, of a blue-and-white colour. It is a native of the East Indies.

The fourth species has purple-coloured spiny leaves, and the flowers in racemes. It is a native of Newfoundland, &c. flowering in June.

The fifth has the leaves elliptical, furrowed, and pointed, with spreading flowers. It is a native of New Zealand.

Culture.—These plants may be increased by sowing the seeds in pots filled with good rich earth, either in the spring or autumn, plunging them in the bark-bed of the stove. After the plants have attained some growth they may be removed into separate pots, and re-plunged in the hot-bed.

The last species is the only one capable of bearing the open air in this climate; all the others requiring to be kept constantly in the stove, where they should be moderately supplied with water.

They afford variety among stove collections, some of them being plants of singular growth.

DRACOCEPHALUM, a genus comprehending plants of the herbaceous, annual, and perennial kind.

It belongs to the class and order *Didymiacæ Gymnospermia*, and ranks in the natural order of *Verticillata*.

The characters, are: that the calyx is a one-leaved perianthium, tubular, permanent, very short: the corolla one-petalled, ringent: tube length of the calyx: throat very large, oblong, inflated, gaping, a little compressed on the back: lip superior straight, arched, complicated, obtuse: lip inferior three-cleft; lateral divisions upright, as it were the segments of the throat; the intermediate one hanging down, small, prominent forwards at the base, roundish, emarginate: the stamina consist of four subulate filaments, hid beneath the upper lip of the corolla, of which two are a little shorter: anthers somewhat cordate: the pistillum is a four-parted germ: style filiform, in the situation of the stamens: stigma two-cleft, sharp, slender, reflex: there is no pericarpium: calyx cherishing the seeds in its bottom: the seeds four, ovate-oblong, three-sided.

The species chiefly cultivated are: 1. *D. Virginianum*, Virginian Dragon's Head; 2. *D. Canariense*, Canary Dragon's Head, or Balm of Gilead; 3. *D. Austriacum*, Austrian Dragon's Head; 4. *D. Ruyschiana*, Hyssop-leaved Dragon's Head; 5. *D. Moldavica*, Moldavian Dragon's Head, or Balm.

There are other species that deserve cultivation.

The first is a perennial plant. It rises with an upright stalk, near three feet high. The leaves are about three inches long, and half an inch broad, sessile; usually in pairs at each joint, but sometimes there are three together. The flowers are purple, in terminating spikes. It is a native of North America, flowering from July to September.

The second species is also a perennial plant, rising with several stalks to the height of three feet or more, becoming woody at the lower part; the leaves at each joint having three or five oblong, pointed, serrate leaflets.—The flowers come out in short thick spikes on the top of the stalks; they are of a pale blue colour. It is a native of the Canary Islands, flowering at the same time as the first.

The third has likewise a perennial root. The stalks are hairy, a foot and half high, sending out several side-branches. The leaves are hairy, linear, cut into three parts. The flowers terminating in short whorled spikes, with some very narrow-leaves (bractes) under each whorl. It is a beautiful plant, growing naturally in Austria, &c.

In the fourth the root is perennial. The stems about two feet high, with two smooth linear leaves at each joint, about an inch long, and one-eighth of an inch broad, with a deep furrow along the middle: at each joint, at the other sides of the stem, come out two or three very narrow small leaves of the same shape. The flowers are in spikes, of a fine blue colour. It is a native of Norway, flowering in June.

The fifth is an annual plant, rising with branching stalks a foot and half high, with oblong leaves, deeply serrate on their edges. The flowers come out in whorls round the stalks at every joint; are blue, and appear in July, continuing to the middle of August. It has a strong balsamic odour, which to some is very agreeable. It is a native of Moldavia.

Culture.—These plants are raised in different methods, according to the kinds.

The first sort is best propagated by parting the roots and planting them out in moist, sheltered, shady situations, either in the autumn or spring.

In the second kind the plants are best raised by sowing the seeds in pots of good mould in the autumn, protecting them by means of a frame and glasses during the winter. When the plants have some growth they may be removed into separate pots, and placed in the open air during the summer, but brought under the shelter of a green-house or garden-frame in the winter; the latter is probably the better practice.

They may likewise be increased by planting cuttings of the young shoots in a warm shady spot during the summer. These, when they have formed good roots, should be removed into pots, to be protected under glasses during the winter.

They require a pretty full exposure to the air when the weather is suitable, being sufficiently hardy to stand the open air in mild winters.

The third and fourth species may be raised by sowing the seeds in the early spring months, in a bed of earth in an open exposure, or in pots. When the plants have attained sufficient growth they should be removed into a spot of fresh light earth, and planted out six inches apart, proper shade and water being given, till they become rooted, or into separate pots. If the pots be plunged in a moderate hot-bed it will greatly forward them.

They must be kept free from weeds till the autumn, in the first situation, when they should be taken up with good balls to their roots, and be planted out in the borders or other parts, where they are to remain. They may also be increased by planting cuttings of the branches in summer, in a shady spot, or in large pots, giving

them shade and water, and afterwards removing them into other pots.

The fifth species must be raised annually by sowing the seeds in patches, in the places where the plants are to remain, in the spring. When the plants appear, they should be properly thinned, and kept perfectly free from weeds.

All the sorts, except the second, may be employed for ornament in the beds or borders of gardens and pleasure-grounds; some of them affording a fine smell, as well as pretty effect in their flowers. They should be raised almost annually, in order to keep good plants.

The second kind is chiefly introduced among green-house collections, both for variety and the fragrant balsamic smell which it affords.

DRACONTIUM, a genus containing a plant of the climbing, evergreen, exotic kind.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Piperitæ*.

The characters are: that the calyx is a spathe, boat-form, leathery, one-valved, very large; spadix extremely simple, cylindric, very short, coated on all sides with fructifications disposed into a head, of each of which the perianthium proper none, unless the corolla be so called: corolla proper five-petalled, concave: petals ovate, obtuse, somewhat equal, coloured: the stamens consist of seven filaments, linear, depressed, upright, equal, longer than the corollet: anthers four-cornered, twin, oblong, obtuse, upright: the pistillum is a somewhat ovate germ: style columnar, straight, length of the stamens: stigma obscure, three-sided: the pericarpium in each a roundish berry: the seeds very many.

The species cultivated is *D. pertusum*, Perforate-leaved Dragon.

It has slender jointed stalks, which put out roots at every joint, that fasten to the trunks of trees, walls, or any support which is near them, and thereby rise to the height of twenty-five or thirty feet: the leaves are placed alternately, standing upon long foot-stalks; are four or five inches long, and two and a half broad, having several oblong holes in each, so that at first they appear as if eaten by insects: the flowers are produced at the top of the stalk, which always swells to a larger size in that part than in any other; are covered with an oblong spatha (or hood) of a whitish green colour, which opens longitudinally on one side, and shows the spadix closely covered with flowers, of a pale yellow, inclining to white. It is a native of the West Indies.

Culture.—This plant is readily increased by planting cuttings of the young branches in pots

filled with light poor sandy earth, and plunging them in the bark-bed of the stove. When they have stricken root they should be removed, with balls of earth about their roots, into separate pots filled with poor earth, in order to check their rambling growth.

These plants, from the singularity of their leaves, and their being evergreen, afford variety in the stove, and at the same time serve to cover the walls of it by their climbing property.

DRAGON'S HEAD. See **DRACOCEPHALUM.**

DRAGON TREE. See **DRACÆNA.**

DRAWING-FRAME, a sort of deep hot-bed frame, or fixed glass-case, for placing particular sorts of curious, tender, annual flower plants in, for drawing them to a tall stature, such as cock's combs, tricolors, &c. by the assistance of a hot-bed.

Different sorts are occasionally adopted; some similar in form to common hot-bed frames, but four or five feet in depth, either moveable or fixed; others with different divisions to place one upon another; and some more spacious erections of glass-work, or, properly, glass-cases, which are in general more adapted for the business than the two first sorts.

These frames are mostly constructed of inch-and-half deal, and, in dimensions, generally the width and length of common large hot-bed frames for two or three lights.

In using such frames, the plants are first raised in a hot-bed under common frames and lights, pricked or planted singly into proper sized pots, in the same or another hot-bed; and after having advanced a foot or a little more in growth, so as to reach the glasses, a fresh hot-bed is made for the drawing-frame, which is placed thereon, and the bed earthed at top with light dry earth, or old tan; then the plants in their pots removed into it, plunging them to their rims in the earth, or other material, and the glasses put on; being afterwards managed as *Tender Annuals*.

Drawing-frames are at present much less in use than formerly, the plants being chiefly suffered to take their natural growth.

DRILL, a small narrow opening made in the ground by means of a hoe or other implement, for the reception of different sorts of seeds and roots, such as pease, beans, potatoes, and various kinds of small seeds, as well the nuts and stones of several sorts of trees, and the bulbous and tuberous roots of many plants of the flower kind.

Drills are generally formed by setting a line as tight as possible in the direction the crops are to be put in, and then with a common hoe held corner-ways, with the edge close to the line,

drawing the drill along it, from half an inch to five or six deep, as the different sorts of seeds and roots may require.

But drills, for some particular small seeds, may be drawn with a small or middling hoe flat-ways, or the edge downwards, in a horizontal position, so as to make a broad flat-bottomed drill; in that way forming a wider level bottom, with a larger space for the seeds, which admits of having them more evenly sown to an equal depth.

For seeds of tender plants which require the aid of hot-beds, as a hoe cannot be introduced, the ends of the two first fingers, or a short flat stick an inch or two broad, may be employed.

DRILL SOWING, the method of putting in crops by depositing the seed in drills: most sorts of crops that are cultivated in rows are put in to the greatest advantage in this way, as those of the pea, common bean, and kidney-bean kind, early potatoes, spinach, and beet, as well as parsley, coriander, and a variety of small seeds for the purpose of salad and other uses.

It is a mode of sowing which is particularly beneficial in affording the means of raising crops with regularity as well as of keeping the ground free from weeds, and earthing up the mould to the roots of the crops, by which their growth is greatly promoted; and likewise, which admits of the greatest convenience in gathering the various sorts of produce.

When the seeds or roots of any sort have been sown or planted in drills, the earth should be immediately drawn evenly over them, either with a hoe or rake, or the hand for the very small or more delicate sorts; but for the large kinds, such as pease, kidney-beans, broad-beans, &c. it may be turned in upon them expeditiously with the feet alternately, carefully covering all to an equal depth, trimming the top of each drill clear from stones and clods, so as to leave a perfectly smooth and even surface for the crops to come up in.

DUNG, a substance formed by passing through the bodies of animals, which is made use of in garden culture, both for the purpose of improving the soil, and that of affording a mild moist artificial heat, by which various sorts of delicate crops may be raised and produced at much earlier periods than could otherwise be the case.

In the intention of amending the condition of the ground, various sorts of dung may be made use of after being considerably reduced by undergoing the process of fermentation; but where the production of heat is the principal object, that of the stable kind must be chiefly

employed, while in its long or littery condition. See HOT-BED.

All sorts of animal dungs may be applied with advantage to soils of different sorts in the way of manure; but that of the stable kind is in general the most beneficial in the raising of garden crops; for which purpose it may often be used after it has been employed in hot-beds, and is considerably reduced. For some sorts of crops, as those of the potatoe, carrot, cabbage, brocoli, cale, and several other similar kinds, it may, however, be used with more benefit while in its littery un-reduced condition, as by its gradually undergoing the process of decomposition within the earth, heat is not only evolved, but various other materials formed and set at liberty which greatly contribute to the growth and support of such crops; and at the same time the earth or mould preserved in a more loose state about their roots, by which they are more readily extended and enlarged. This last is a circumstance of great utility in potatoe, carrot, parsnip, and other similar tap and tuberous-rooted crops.

The nature and mode of application of these substances will be explained in another part of the work. See MANURE.

DWARF TREES, such trees of the fruit kind as are raised by grafting or budding stocks within a few inches of the ground, and which only form their heads to the height of a few feet, as from four or five to seven or eight, according to the kinds. It also comprehends such dwarf trees as are planted for espaliers, as well as those that are standards, though it is the latter that belong to this head.

Formerly, when trees of this sort were more attended to, they were trained in many different forms, from which they took their titles: thus, there were *Concave*, *Convex*, *Horizontal*, *Spiral*, and *Natural Dwarf Trees*, according as their heads were formed. In the forming of these trees, the method chiefly practised in the different sorts will be described in another place. See **TRAINING OF FRUIT-TREES**.

The kinds of fruit-trees most commonly employed in this way, are those of the apple, pear, plum, cherry, apricot, fig, and filbert kinds; but other sorts may be trained in the same manner.

To have good trees of these sorts, they should be grafted upon dwarf stocks, those of the apple on paradise stocks, and the pear kind on quince stocks. The former are, however, of

a shorter duration when raised on these stocks, than on those of the crab or apple kind.

The sorts of pears most adapted to this method are those of the summer or autumn fruited kinds, as the winter sorts never answer well in this method of management.

These kinds of fruit-trees should never be planted nearer together than fifteen or twenty feet, though Martyn, for those on paradise stocks, has mentioned six or eight; on Dutch stocks eighteen or twenty; and for those on crab or apple stocks twenty-five or thirty. The reasons why trees of this form are not in so much esteem for planting in gardens now as they were formerly, are, that of their being less advantageous in producing fruit from their form than those of the espalier kind; the ground being kept clear under them with more difficulty; their taking up too much room when grown to a large size; the air not circulating so freely about their stems, by which the fruit may be injured; the great difficulty of getting at the middle of the trees in the summer without displacing the fruit on the outside branches; and the greater destruction of the fruit-buds in consequence of the nature of their training. Mr. Forsyth, however, in his useful Treatise on the "Culture and Management of Fruit-Trees," recommends the planting of dwarf plum-trees in the kitchen garden as standards, in the middle of six-feet wide borders, at the distance of seventeen yards, training them up to have stems about three feet in height. And in the long narrow royal gardens at Kensington, which are much exposed to the winds, he has found two rows of apple-trees intermixed alternately with other fruit-trees planted on each side of the middle walk, which extends the whole length, at the distance of seventeen yards from each other; with others in two rows in the six-feet borders on the sides of the cross paths, at the distance of fourteen feet, to be highly beneficial in breaking the force of high winds; while the fruit can be conveniently gathered by a person standing on the ground. And as plums can be planted in the same manner with similar intentions; the quarters may be kept clear for culinary crops, and a free circulation of air admitted, which cannot be the case with espaliers. Besides, dwarf standards, which can be trained to any size, appear much better than espaliers, and at the same time afford a greater proportion of fruit.

EARTH, a substance constituted of various combinations of terrene materials. It forms the bed in which vegetables establish themselves and take their growth. The vegetable earth near the surface is in general the most fruitful and productive, as containing the largest proportions of vegetable and animal matters; the goodness of the inferior parts being estimated, as they approach or recede from it. For the purpose of perfect vegetation, it should neither be too stiff and adhesive, nor too light and porous, as in the former case the component particles are too close and compact to afford the roots of plants a sufficiently ready entrance to extend themselves and collect their nourishment; and in the latter, they are too loose and open to afford that stability and support to the plants which is necessary, as well as incapable of retaining a due degree of moisture for promoting their healthy growth.

Earth for the purpose of garden culture should therefore neither be of a too loamy or clayey, or too loose and sandy a quality; but of a rich, rather light, pliant nature, capable of being worked at all seasons without inconvenience, and of sufficient depth, as from one to two feet, to admit the roots of all sorts of plants and trees to extend themselves with facility.

The black vegetable, hazelly-brown, and chesnut-coloured loams are all proper for the purpose of garden ground. And many other sorts of earth that are of a more stiff and retentive nature may be made so by the application of such substances as are of a contrary quality. See **SOIL**.

EBENUS, a genus comprising a plant of the hoary, evergreen, flowery, exotic, shrubby kind, for the green-house.

It belongs to the class and order *Diadelphia Decandria*.

The characters are: that the calyx is a one-leaved, bell-shaped perianthium, terminated by five filiform teeth, which are villose, and nearly equal: the corolla is papilionaceous, length of the calyx: standard roundish, straight, entire: rudiments of wings obscure, crescent-shaped: keel crescent-shaped, gibbous, ascending at the tip: the stamina have diadelphous filaments, all growing together into a sheath, with tips distinct: anthers roundish: the pistillum, a roundish germ, villose: style capillary: stigma terminal, acuminate: the pericarpium is an ovate legume: the seed single, and rough with hairs.

The species cultivated is *E. Cretica*, Cretan Ebony.

It rises with a shrubby stalk three or four feet high, having several side branches. The leaves at each joint hoary, composed of five narrow lanceolate leaflets, which join at their tails to the foot-stalk, and spread out like the fingers of a hand. The branches are terminated by thick spikes of large purple flowers; from two to three inches long, making a fine appearance. It flowers in June and July, and in very warm seasons sometimes perfects seeds in this climate. It is a native of Crete.

Culture.—These plants may be increased by seeds, which should be sown in the autumn, in pots filled with light earth, and placed under a frame in the winter, to be protected from frosts.

When the plants come up in the spring, they should be kept clean from weeds, and be refreshed now and then with water. After they have acquired strength to be removed, they should be planted in separate small pots of the same earth, and plunged into a moderate hot-bed, just to promote their taking new root, then gradually inured to the open air, and removed in the latter end of May into a sheltered situation, to remain till autumn, when they should again be brought under shelter, as they will not live in the open air during the winter; but they must not be too tenderly treated, as they are apt to draw up weak. They should in winter be sparingly watered, but in summer often refreshed. They afford variety in the green-house.

ECHINOPS, a genus containing plants of the hardy, herbaceous, perennial and annual kinds.

It belongs to the class and order *Syngenesia Polygamia Segregata*, and ranks in the natural order of *Compositæ Capitatæ*.

The characters are: that the calyx is common, many-leaved, with scales subulate, totally reflected, containing many flowers: perianthium partial one-flowered, oblong, imbricate, cornered: leaflets subulate, loose above, upright, permanent: the corolla one-petalled, length of the calyx, tubular; border five-cleft, reflex, spreading: the stamina consist of five capillary filaments, very short: anthers cylindric, tubular, five-toothed: the pistillum is an oblong germ: style filiform, length of the corolla: stigma double, somewhat depressed, rolled back: there is no pericarpium: calyx unchanged, larger: the seed single, ovate-oblong, narrower at the base, with obtuse tip: the down obscure; the receptacle common globose and bristly.

The species cultivated are: 1. *E. sphærocephalus*, Great Globe Thistle; 2. *E. ritro*, Small

Globe Thistle; 3. *E. strigosus*, Annual Globe Thistle.

The first has a perennial root. The stalks many, four or five feet high. The leaves long and jagged, divided into many segments almost to the midrib, the jags ending in spines; they are of a dark-green on their upper side, but woolly on their under. There are several globular heads of flowers on each stalk. The florets are commonly blue, but sometimes white. These come out in July, and the seeds ripen in August. It is a native of France, &c.

It varies with white flowers.

The second species has a perennial creeping root, sending up several strong stalks two feet high, and branching. The leaves cut into many fine segments to the midrib. Each branch is terminated by a globular head of flowers, smaller than those of the first, and of a deeper blue, but sometimes white: they come out in July. It is a native of the South of France.

It also varies with white flowers.

The third is an annual plant, with a stiff white stalk two feet high. The leaves divided, ending in many points, which have spines; their upper side green, covered with brown hairs, their under side white and woolly: the stalk is terminated by one large head of pale blue flowers, appearing in July. It is a native of France, &c.

Culture.—These plants are readily increased by sowing the seeds in the autumn in the places where the plants are to grow. When they are come up in the spring, they should be properly thinned and kept free from weeds. Some of the strongest plants may likewise be removed to other situations. In the third sort the seeds are better sown in the early spring.

They are well suited to afford variety in the large borders of gardens or pleasure-grounds, as they succeed in almost any soil.

EDGING, a range of small, dwarf, evergreen plants, as box, thrift, &c. closely planted on the side of borders or beds, for use and ornament.

They are particularly necessary to such borders as immediately verge walks or alleys of gravel, sand, shells, or other loose materials; to preserve the earth from being forced out upon them. They are likewise neat and useful as divisions in the flower-garden between the beds.

The first of these is the most effectual; easily kept in order, and the most durable; retaining its leaves and full verdure at all seasons, prospering in all soils and situations, being never hurt by any weather, and enduring many years close and regular, with the culture of merely clipping once or twice every summer at the top and sides.

The latter also grows very close, low, and is in verdure all the year; flowering beautifully two months in summer, but is apt to spread out of

bounds, requiring to be reduced by cutting in considerably on each side, or by replanting it afresh every two or three years. It is necessary to trim it a little with garden-shears on the sides and tops every summer as soon as it has done flowering, cutting off and removing all the withered flower-stalks, which is best performed during moist weather.

There are several other plants of low growth, such as daisies, pinks, chamomile, London-pride, catchfly, evergreen flowery perennials, that are sometimes employed as edgings, which have a pretty effect when in flower; but as in one year they spread greatly out of compass, they should be taken up and re-planted every spring or autumn, particularly the daisies.

Dwarf bushy annuals are also sometimes sown for summer edgings in small gardens, such as the dwarf virgin-stock, heart's-ease, candy-tuft, and several other low, bushy, annual flowers; but the first is the most suitable, as it grows low, bushy, and does not ramble; is very flowery, and continues long in bloom. Some sorts of shrubby aromatics are likewise used—as thyme, savory, hyssop, sage, lavender, and rue, all of which are evergreen, and may be kept low by close shearing; but then they are liable to become woody, stubbed, and naked.

Parsley is also a good evergreen edging for the edges of the quarters and borders of kitchen gardens; and strawberries are occasionally planted for this purpose; and where the runners in summer are kept trimmed in close, the plants have an agreeable appearance when in blossom and fruit.

In the planting or forming edgings—if box, the plants are generally placed in small, perpendicular trenches, close together, so as at once to form a complete edging. Thrift, daisies, pinks, &c. are commonly planted by dibble, at about two or three inches distance in the line, though, to form a compact edging at once, they may be planted so close as to touch each other. Pink-edgings may be formed by sowing the seed in a drill along the edge half an inch deep, suffering the plants to remain; and annual flower edgings are formed in the same manner: thyme, savory, and hyssop edgings may either be formed by sowing the seed, or by plants or slips; sage and lavender, chiefly by planting young slips; and rue in the same way, or by seed.

All the shrubby kinds of edgings should be neatly shorn or clipped with garden-shears, at the top and sides, every year in summer; and some sorts require it twice in that time, to preserve them perfectly neat, such as box.

These should never be suffered to exceed two or three inches in width, nor above three high; and those of thrift and the other herbaceous plants are not to get more than three or four

inches in width. The aromatic kinds, if in pleasure-grounds, should not exceed five or six inches in height, nor more than three or four in breadth.

In trimming box edgings, the top should be clipped along first in a level or even manner, then on the sides. Other low edgings should be cut and kept in a somewhat similar manner at top and sides, which, in those of the flowering kind, should generally be trimmed to regular order as soon as the flowers decay.

EDGING-IRON, an implement employed for cutting even the solid edges of grass-plats, lawns, &c.

In the blade it is made somewhat in the crescent form, or like a large cheese-knife, rounding below at the edge part, and with a socket above, upright in the middle, in which to fix a long straight handle of wood, three or four feet long. See PLATE ON GARDEN IMPLEMENTS.

In executing this work in straight edges, a line may be set as a guide to cut regularly even and straight by; but in curves, sweeps, or serpentine edges, the eye and a steady hand must be the guide: in both modes the edging-iron should be held obliquely or slanting flat-ways to the edge, cutting clean downward an inch or more deep, forming the edge even and upright; the cuttings being directly cleared away to the bottom.

It is likewise useful in new laid grass-plats, &c. which generally require the edges of the sward to be cut in even to their proper form and bounds, and which can be effected in this way to greater exactness than with a spade, and in a more even and regular method.

EDGING-SHEARS, an implement of the scissar kind, calculated for trimming the rough edges of grass-plats and lawns; being used only in cutting or clipping the projecting loose grass. See PLATE ON GARDEN IMPLEMENTS.

The most eligible kind for this purpose are such as are in the form of sheep-shearing shears, wholly of iron, formed with an elastic bow handle, without any wooden handle as in the common garden-shears: they may, however, be formed with long wooden handles, and be so contrived, as to clip the level surface as well as the edges: they are useful in the summer season when the grass grows out rough and irregular along the edges into the walks, &c. and requires to be trimmed in close and even occasionally, which may be expeditiously performed with these kind of shears, by being held with one hand, and run along the edges, cutting, as they proceed, the loose projecting grass close and even to the solid sward or green surface.

This work is also often effected with the point of common hedge-shears and a garden knife.

EHRETIA, a genus comprising plants of the exotic tree kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a one-leaved perianthium, bell-shaped, half five-cleft, obtuse, very small, permanent: the corolla one-petalled: tubelarger than the calyx: border five-cleft: divisions somewhat ovate, flat: the stamina consist of five subulate, patulous filaments, length of the corolla: anthers roundish, incumbent: the pistillum is a roundish germ: style filiform, thicker above, length of the stamens: stigma obtuse, emarginate: the pericarpium a roundish one-celled berry: the seeds four, convex on one side, cornered on the other.

The species cultivated are: 1. *E. tinifolia*, Tinus-leaved Ehretia; 2. *E. bourreria*, Oval-leaved Ehretia; 3. *E. exsucca*, Dry-fruited Ehretia.

The first is an upright tree, in its native state from twenty to thirty feet high, with an oblong thick head: the branches unarmed, roundish, subdivided; the leaves alternate, veined, blunt, about four inches long, on short petioles: panicles terminating, oblong, large: the flowers terminating, numerous, white, and small, succeeded by a small berry. It is a native of Cuba.

In Jamaica it is known by the name of *Bastard Cherry-tree*.

The second species is a small inelegant tree, having an adust habit, fifteen feet high in some situations, in others seldom five: the trunk unequal, with a chinky bark: branches very many, irregular: the leaves alternate, petioled, quite entire, various; obtuse, acute or emarginate; smooth, on rocks, rugged in other places, differing in size; oblong, ovate: the flowers in corymbs, sweet, of a white colour. It is a native of the West Indies.

The third is a small tree fifteen feet in height; sometimes erect, sometimes supporting itself on other trees: the leaves are ovate, acute, very smooth, alternate, petioled, two inches long: the racemes branched, subcorymbd, subterminating: the flowers having a slight degree of sweetness, much larger than in the preceding ones, succeeded by green four-cornered berries. It is a native of Spain.

Culture.—These plants may be increased by sowing the seeds procured from abroad in the spring season, in pots of light earth, plunging them in a hot-bed. When the plants have attained proper growth, they should be removed into separate pots, and replunged in the bark-bed of the stove.

They are likewise capable of being propagated by laying down the young shoots in the spring; but in this way they are long in striking root.

They require the protection of a moderate stove during the autumn and winter, but when they have had some growth, they may be set out in the summer in the open air in hot weather.

They have a fine effect in their exuberant foliage among other stove plants, all the species affording much variety.

ELÆAGNUS, a genus containing plants of the shrubby deciduous kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Elæagni*.

The characters are: that the calyx is a one-leaved, four-cleft perianthium, superior, straight, bell-form, outwardly scabrous, inwardly coloured, deciduous: there is no corolla: the stamina consist of four filaments, very short, inserted into the calyx below the divisions: anthers oblong, incumbent: the pistillum is a roundish, inferior germ: style simple, a little shorter than the calyx: stigma simple: the pericarpium an ovate, obtuse drupe, smooth, with a dotted tip: the seed an oblong obtuse nut.

The species cultivated are: 1. *E. angustifolia*, Narrow-leaved Oleaster, or Wild Olive; 2. *E. orientalis*, Oriental Oleaster, or Wild Olive; 3. *E. latifolia*, Broad-leaved Oleaster, or Wild Olive.

The first is a tree branching from the bottom, growing sometimes to the height of three fathoms, with a trunk the thickness of a man's arm or thigh, elegant in its appearance, especially from the silvery brightness of the leaves: the bark is smooth, brown: wood pale, prettily varined with gray and brown, but not hard: the branches and branchlets slender, frequent, alternate, smooth, unarmed, or having thorns, especially in young trees: the leaves are petioled, in the more northern parts lanceolate, in the more southern broader, rather obtuse, and larger; silvery white underneath, on their upper surface hoary-greenish, and shining very much: the flowers come out at the middle leaves of the smaller branches, usually solitary or two together, sometimes, but very seldom, three from each axil, in which case one or two are on shorter peduncles and barren, succeeded by a solitary drupe, oblong, hoary-white when young, thicker and yellowish when ripe, inclosing within a sweet pulp a woody, gray, furrowed nut. It is a native of the South of Europe, &c.

Miller particularly distinguishes it from the thorny and unarmed narrow-leaved Oleaster: the latter he considers as that which is most commonly preserved in our gardens: the leaves in this are not more than two inches long, and about three quarters of an inch broad in the middle; are white, and have a soft cottony down on their surface; and at the footstalk of every leaf comes out a pretty long sharp thorn: the leaves

being alternate, the spines come out on each side of the branches: the flowers are small, and have a strong scent when fully open.

The second species, in the stature and manner of growth, is a tree that resembles a middle-sized willow, as also in the hoariness of its leaves and the division of its branches: the bark is gray, and cloven in the trunk: the small branches alternate, all white-tomentose: the leaves are alternate, oblong-ovate, and oval, quite entire, petioled, with a snowy hoariness underneath, and dotted-hoary on the upper surface, not shining, but soft. The wild sorts have sharp straight thorns scattered variously over the branches, which on the smaller twigs are hoary all over, and bear leaves: but the cultivated trees have no thorns: the flowers are alternate, peduncled, solitary, and extremely fragrant: the fruit ovate, very obscurely octangular, tomentose; the nut furrowed, having a cylindric kernel: it has much the appearance of the first, but is a native of Persia.

The third has a tuberous root, and rises with a woody stem to the height of eight or nine feet, dividing into many branches: the leaves are silvery, with several irregular dark-coloured spots; are alternate, and continue all the year: the flowers are lateral, white, on one-flowered peduncles, several together: the fruit small ovate, containing one seed. Native of the East Indies.

Miller remarks, that it is rare at present in our gardens.

Culture.—These plants may be increased either by seeds, layers, or cuttings; but the latter is the readiest and most common method.

The seed, when it can be procured, may be sown in pots of light earth in the spring, plunging them in the hot-bed; and, when the plants are of some growth, removing them into other pots or situations, where they may remain a year or two.

The layers and cuttings of the young shoots should be laid down or planted out in the autumn or early spring, those made from the tender sorts being put in pots, and placed in the hot-bed of the stove. When they are become well rooted, they may be removed, the hardy sorts into the nursery to have a few years growth, and those of the tender kinds into separate pots, to have the protection of the green-house and stove.

These are all ornamental plants, the first sort being well adapted to afford variety in the clumps and borders of shrubberies, the second to the green-house, and the last to the stove. As the plants in the first sorts do not continue long, new ones should be raised every two or three years.

ELDER. See **SAMBUCUS**.

ELEPHANTOPUS, a genus comprising plants of the flowery, herbaceous, exotic kind.

It belongs to the class and order *Syngenesia Polygamia Segregata*, and ranks in the natural order of *Compositæ Capitatæ*.

The characters are: that the calyx is an involucre of three broad, sharp leaflets, many-flowered, large, permanent, without an umbel: perianthium partial, four-flowered, oblong, imbricate; scales lance-subulate, mucronate, upright, of which the four longer are equal: the corolla compound tubular: corollets hermaphrodite five or four, equal, disposed in a single circle. Proper one-petalled, tubular: border narrow, five-parted, nearly equal: the stamina consist of five capillary filaments, very short: anther cylindric, tubular: the pistillum is an ovate, crowned germ: style filiform, length of the stamens: stigmas two, slender, spreading: there is no pericarpium: calyx unchanged: the seeds solitary, compressed: down bristle-form: the receptacle is naked.

The species cultivated are: 1. *E. scaber*, Rough-leaved Elephant's Foot; 2. *E. tomentosus*, Woolly-leaved Elephant's Foot.

The first sends out from a perennial root many oblong rough leaves, which spread near the ground; between which, in the spring, arises a branching stalk, little more than a foot high: the side branches are short, and generally terminated by two heads of flowers, each on a short peduncle: the florets are of a pale purple colour. It is a native of the East and West Indies, flowering about the beginning of autumn.

The second species generally rises to the height of fifteen or twenty inches, sometimes more. The common receptacles of the flowers rise singly from the axils of the upper leaves, and seem disposed in the form of a spike, but there are seldom more than four florets in each. At first coming up it has many leaves, five inches long, and an inch and half broad where broadest; beginning very narrow, continuing so for two inches, and ending in a round point; are hard, smooth, dark green, and indented about the edges. From among these a round, strong, green stalk rises, four feet high, with an embracing leaf at each joint: it has branches towards the top, standing round at every joint, divided into others, which are beset with smaller leaves. From the axils of these come out the flowers, without any peduncle, standing in several green leaves; they are white, in bundles, without any involucre. It is a native of Jamaica, &c.

Culture.—These plants are capable of being increased by sowing the seed in the early spring on a moderate hot-bed, or in pots plunged in it. When the plants have attained a little growth,

they should be removed into pots filled with light fresh earth, and be re-plunged in the bark hot-bed, due shade and water being given, till they are fresh rooted, air and water being then freely afforded when the season is hot.

These plants require the protection of the green-house in winter, but may be placed abroad a little in the hot summer season.

They afford variety among other potted greenhouse plants.

ELM-TREE. See **ULMUS**.

EMPETRUM, a genus containing plants of the under-shrubby kind.

It belongs to the class and order *Dioecia Triandria*, and ranks in the natural order of *Ericæ*.

The characters are: that in the male the calyx is a three-parted perianthium; divisions ovate, permanent: the corolla has three petals, ovate-oblong, narrower at the base, larger than the calyx, withering: the stamina consist of three capillary filaments, very long, hanging forwards: anthers upright, short, two-parted. In the female the calyx is a perianthium, as in the male: the pistillum is a superior germ, depressed: style scarce any: stigmas nine, reflex-expanding (styles three to nine): the pericarpium an orbiculate berry, depressed, one-celled, larger than the calyx: the seeds nine, jointedly placed in a circle, on one side bulging, on the other cornered (three to nine).

The species are: 1. *E. nigrum*, Black-berried Heath; 2. *E. album*, White-berried Heath.

The first is a small decumbent shrub; the outer bark deciduous, and of a brown colour, the inner yellow: branches rough with the remains of the petioles: the terminating bud consists of five membranaceous leaflets, hairy at the edge; this puts forth five little branches, of which four are in a whorl: the leaves are in fours, somewhat three-cornered, with a white linear keel, and petioled: the flowers axillary, sessile, and solitary: the berries brownish-black, when ripe; the size of juniper berries. It is a native of the north of Europe, flowering in April.

The second species differs from the above in having the smaller branches pubescent; the leaves longer, somewhat scabrous on their upper surface, and channelled underneath: the berry guarded at the base by a fleshy, white, shining calyx. It is a native of Portugal.

Culture.—These plants are capable of being raised from seed, slips, or offsets, and layers; but the best method is that of planting the young plants procured from the places where they grow naturally.

The seeds in the first sort may be sown in situations where the earth is boggy, and there is a degree of shade and moisture, in the open ground, in the spring season; but in the second

sort it must be sown in pots, and plunged in the hot-bed under glasses to bring them forward: in this way the plants grow slowly. The slips and layers may likewise be planted in the same situations, according to the different kinds, in the spring or summer season. The potted sort succeeds best when the pots are filled with boggy or peaty earth.

The first sort affords variety in the fronts of the borders and clumps of shrubberies, and the latter in the same situations in the green-house.

ENDIVE. See CICHORIUM.

EPHEDRA, a genus containing plants of the under-shrubby, evergreen kind.

It belongs to the class and order *Dioecia Monadelphæa*, and ranks in the natural order of *Coniferae*.

The characters are: that in the male the calyx is a compounded ament of one-flowered scales, few, roundish, concave, length of the perianthium: the perianthium proper one-leaved, half-two-cleft, roundish, inflated, small, compressed; divisions obtuse: there is no corolla: the stamina consist of seven filaments, coalescing into a subulate pillar, divided at the tip, longer than the calyx: anthers roundish, turned outwards, of which four are interior; the other three superior. In the female the calyx is a five-fold perianthium, one placed on another, with alternate divisions, in an ovate figure; each one-leaved, somewhat ovate, two-parted; the exterior ones smaller: there is no corolla: the pistillum two ovate germs, size of the last perianthium, on which they are placed: styles simple, filiform, short: stigmas simple: there is no pericarpium: calycine scales all thickened, succulent, constituting a divided berry: the seeds two, ovate-sharp, on one side convex, on the other flat, compressed by the calyx covering them on every side.

The species cultivated are: 1. *E. distachya*, Great Shrubby Horse Tail, or Sea Grape; 2. *E. monostachya*, Small Shrubby Horse Tail.

The first has a low, under-shrubby stem, sometimes branching to the height of two feet, having various small joints, from which come off opposite narrow shoots, branching out into long rushy tufts, opening in the manner of leaves, for which they serve. It is a native of the south of Europe, flowering from June to July.

The second species rises with a low under-shrubby stalk to the height of not more than about a foot, sending off branches in a similar growth to the first. It is a native of Siberia, flowering from September to November.

Culture.—The propagation in these plants is easily effected by planting the offsets, taken from

their creeping roots in the early spring season, in a situation where the ground is rather stiff and moist. They were formerly cultivated in pots, but they are now found to answer better in the open air.

They afford variety in the small borders and clumps, by their singular growth and appearance.

EPIGÆA, a genus containing a plant of the low, trailing, flowery, shrubby kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a double perianthium, approximated, permanent; exterior three-leaved; leaflets ovate-lanceolate, acuminate; the exterior large: interior five-parted, upright, a little longer than the exterior: leaflets lanceolate, acuminate: the corolla one-petalled, salver-form: tube cylindric, as long as the calyx or longer, hirsute within: border spreading, five-parted: lobes ovate-oblong: the stamina consist of ten filiform filaments, length of the tube, affixed to the base of the corolla: anthers oblong, sharp: the pistillum is a globose germ, villose: style filiform, length of the stamens: stigma obtuse, subquincifid: the pericarpium a subglobose capsule, depressed, five-cornered, five-celled, five-valved: the seeds very many and roundish: the receptacle large, and five-parted.

The species chiefly cultivated is *E. repens*, Creeping Epigæa, or Trailing Arbutus.

It is a low plant, with a trailing shrubby stalk, which puts out roots at the joints. The stalks are garnished with oblong rough leaves, waved on their edges. The flowers are produced at the end of the branches in loose bunches of a white colour, and divided at the top into five acute segments, which spread open in form of a star. It flowers in July, but does not produce fruit in this climate. It is a native of Virginia, &c.

Culture.—In this plant it is easily effected by its trailing stalks, which put out roots at the joints, and may be cut off from the old plant and planted in a shady situation, where the soil is moist, in autumn, that the plants may be well rooted before the spring. When the winter proves very severe, it is necessary to lay a few dried leaves, or other light covering, over them, to protect them from frost; and after they are well rooted they only require to be kept free from weeds.

These plants afford variety in the fronts of shrubberies, and other parts of ornamented grounds.

EPILOBIUM, a genus containing a plant of the herbaceous, flowery, perennial kind.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Calycanthemaceae*.

The characters are: that the calyx is a one-leaved perianthium, four-parted, superior; divisions oblong, acuminate, coloured, deciduous: the corolla has four roundish petals, outwardly wider, emarginate, expanding, inserted into the divisions of the calyx: the stamina consist of eight subulate filaments; the alternate ones shorter: anthers oval, compressed, obtuse: the pistillum is a cylindric germ, extremely long, inferior: style filiform: stigma four-cleft, thick, obtuse, rolled back: the pericarpium is an extremely long capsule, cylindric, streaked, four-celled, four-valved: the seeds numerous, oblong, crowned with down: receptacle extremely long, four-cornered, free, flexile, and coloured.

The species cultivated is *E. angustifolium*, Narrow-leaved or Rose-bay Willow-herb.

It has a creeping root. The stem is upright, from three to six feet high, branched at top, round, and pubescent; the branches alternate. The leaves alternate, running slightly down the stem, smooth, the edge minutely and rarely indented, the midrib whitish: the lateral nerves are nearly at right angles with this; and the leaves at their first appearance are rolled in at the edge. The flowers are purple, showy, growing in a kind of long spike, on purple peduncles, the length of the germ, bending down before the flowers open, but afterwards erect; seldom more than four or five blown together on the same spike. From the great similitude of the leaves to those of willow, it has obtained the name of Willow-herb, or French Willow.

There is a variety with white flowers.

Culture.—It is readily increased by dividing its creeping roots, and planting portions of them out in moist shady situations where they are to remain, in either the autumn or early spring. The plants may also be raised by sowing the seeds in the same situations. The plants afterwards require only to be kept within proper limits.

They are well suited to shady situations, and for covering rock-work.

EPIMEDIUM, a genus containing a plant of the low, herbaceous, flowery, perennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Corydalleae*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate, obtuse, concave, expanding, small, placed directly (not alternately) below the petals, caducous (with a single bract at the base of two of them): the corolla has four petals, obtuse, concave, expand-

ing: nectaries four, cup form, (slipper-form,) with obtuse bottoms, of the size of the petals, and leaning on them, affixed by the edge of the mouth to the receptacle: the stamina consist of four subulate filaments, pressing on the style: anthers oblong, erect, two-celled, two-valved, gaping from the base towards the tip, with a free dissepiment: the pistillum is an oblong germ: style shorter than the germ, length of the stamens: stigma simple: the pericarpium is an oblong silique, acuminate, one-celled, two-valved: the seeds very many, and oblong.

The species is *E. alpinum*, Alpine Barrenwort.

It has a creeping root, from which arise many stiff smooth stalks, about nine inches high, cylindric, simple, near the root surrounded with scales, at top trichotomous. The leaves once and twice ternate, pendulous, heart-shaped, ending in a point, serrate; the serratures ending in a hair, pale green on the upper side, gray on the under. The raceme a finger's length, naked, loose, lateral, with three or four branchlets, usually two-flowered, supported by a rufous bracte. It is a native of the Alps, flowering in April and May.

Culture.—It is readily increased, by planting portions of its creeping roots in moist shady situations in the autumn or spring. It afterwards requires to be re-trenched, to keep it from injuring other plants.

It affords ornament and variety in the borders, by its singular growth.

ERICA, a genus comprehending plants of the evergreen, flowery, shrubby kind; mostly exotics.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate-oblong, permanent: the corolla one-petalled, bell-form, four-cleft, often bellied: the stamina consist of eight filaments, capillary, inserted into the receptacle: anthers two-cleft at the tip: the pistillum is a roundish, superior germ: style filiform, upright, longer than the stamens: stigma crowned, four-cornered, four-cleft: the pericarpium is a roundish capsule, smaller than the calyx, covered, four-celled, four-valved: partitions meeting with the sutures (opposite to the sutures): the seeds numerous and very small.

The species most in cultivation, according to Martyn, are: 1. *E. Tetralix*, Cross-leaved Heath; 2. *E. cinerea*, Fine-leaved Heath; 3. *E. didyma*, Double-anthered Heath; 4. *E. arborea*, Tree Heath; 5. *E. Australis*, Spanish Heath; 6. *E. multiflora*, Many-flowered Heath; 7. *E. Me-*

diterranea, Mediterranean Heath; 8. *E. lutea*, Yellow Heath; 9. *E. haliacaba*, Purple-stalked Heath; 10. *E. monsoniana*, Bladder-flowered Heath; 11. *E. mucosa*, Mucous Heath; 12. *E. urceolaris*, Hairy-flowered Heath; 13. *E. marifolia*, Marum-leaved Heath; 14. *E. cruenta*, Bloody-flowered Heath; 15. *E. ramentacea*, Slender-branched Heath; 16. *E. persoluta*, Blush-flowered Heath; 17. *E. triflora*, Three-flowered Heath; 18. *E. baccans*, Arbutus-flowered Heath; 19. *E. corifolia*, Slender-twigged Heath; 20. *E. empetrifolia*, Crow Berry-leaved Heath; 21. *E. capitata*, Woolly Heath; 22. *E. tubiflora*, Tube-flowered Heath; 23. *E. conspicua*, Long-tubed Yellow Heath; 24. *E. cerinthioides*, Honeywort-flowered Heath; 25. *E. comosa*, Tufted-flowered Heath; 26. *E. massoni*, Tall Downy Heath; 27. *E. Plukenetii*, Smooth-twigged Pencil-flowered Heath; 28. *E. Petiveri*, Downy-twigged Pencil-flowered Heath; 29. *E. herbacea*, Early-flowered Dwarf Heath; 30. *E. grandiflora*, Great-flowered Heath.

There are many other species equally deserving of cultivation.

The first has shrubby stems, from nine to twelve inches high, branched, brown, somewhat rugged from the remains of the leaves which have fallen off: branches a little woolly: the leaves are commonly in fours, but sometimes in fives, ovate-linear, spreading, near the flowers pressed close to the stem, the edges turned in and ciliated, each hair terminating in a small round gland; the upper surface is flat, the lower concave and white: flowers hanging down one over another all one way. It is a native of the northern parts of Europe, flowering in July and August; but according to Linnaeus, twice in the year.

It is not inferior to many of the foreign heaths in the beauty and delicacy of its flowers. This is distinguished from the other British heaths, not only by the flowers growing in a kind of pendulous cluster on the tops of the stalks, but by the leaves growing in fours, and forming a sort of cross.

The second species has a perennial woody root: the stems shrubby, about a foot high, with opposite branches: the bark ash-coloured: the leaves are linear, fleshy, spreading; above smooth and shining, transversely wrinkled; towards the end beset with a few scattered hair-like points; beneath having a longitudinal furrow, which is white from a woolliness apparent to the magnifier; the edge somewhat membranaceous, and when viewed with the microscope appearing serrulate: the leaves, when young, have three flat sides, but when full grown are nearly flat: the flowers are in long clustered whorls terminating

in spikes, of a deep purple colour, sonorous when struck; they come out from the sides of the young shoots; those from the end-shoots being near each other, but scattered and bare; those from the small lateral branches generally in pairs. It is a native of the middle parts of Europe, flowering from June to August.

The third has twisted, trailing stems: the branches between scored and angular, light reddish brown; the more slender shoots ash-coloured, all lateral, to seven or more rising from the same point in the manner of an umbel; when beginning to flower, gradually tapering towards the end: the leaves are linear, somewhat like those of fir, bowed sideways, smooth, but not glossy, somewhat pointed, when magnified appearing to have distant serratures on the edge, which is bent in; upper surface green, slightly elevated in the middle; under whitish, convex, with a smooth furrow running along it, longer, and sometimes thrice as long as the corolla, and crowded so close as to conceal the younger shoots: the flowers roundish, on long slender peduncles, from the sides of the branches, beginning from below the middle, and extending to the ends, continuing on, in the cultivated plants, till the next season. It is a native of Britain.

The fourth species is an upright shrub, growing to the height of six feet, with upright branches covered with a white nap: the leaves are very abundant, upright, smooth, almost awl-shaped, covering the branches, wrinkled when dry: the flowers very numerous, on the middle of the branches, so that the later leaves are above them; they are on branching peduncles, forming a panicle. It is a native of the South of Europe, flowering from February to May.

The fifth is an upright rigid shrub, with an ash-coloured bark: the leaves are in threes or fours, linear, obtuse, somewhat rugged on the edge: the flowers terminating, two or three, subsessile. It is a native of Spain, flowering in April and May.

The sixth species has the stem the height of a man: the leaves are in fours or fives, spreading, obtuse, gibbous at the base: the flowers purplish. It is a native of the South of Europe, flowering from June to November.

The seventh has the branches whitish, and angular: the leaves are in fours, seldom in fives, and even: the flowers lateral, and of a purple colour, simple, coloured, lanceolate, acute, shorter by half than the corolla: style twice as long as the corolla: stigma entirely simple: it resembles the *multiflora*, but the corolla is absolutely ovate; the branches angular and white. It is a native of the South of Europe, flowering from March to May.

In the eighth species the stem is subdivided into narrow branches: the leaves pressed close, almost imbricate, opposite, blunt, grooved underneath, a line in length: the flowers are on the extreme branchlets, one, two, or three together, and upright, of a yellow colour. The whole plant being covered with shining golden or silvery flowers is very beautiful and ornamental. It is a native of the Cape of Good Hope. It varies with yellow or white flowers.

The ninth is a lofty shrub with purplish branches: the branchlets subtomentose and white: the leaves crowded very much, even, rugged about the edge.

But according to Thunberg, the stem is smooth, rugged, brown, flexuose, decumbent, strict, a span high: the branches alternate, divaricate, like the stem: the leaves in threes, lanceolate, acute, smooth, flat above, convex beneath, with a slender groove, spreading. It is a native of the Cape of Good Hope, flowering in May and June. It is distinguished from the other sorts by the size of the flowers.

In the tenth the stem is erect, pubescent leafless, two feet high: the branches scattered, frequent, spreading, covered with leaves, very short, simple: the leaves in threes, ovate, obtuse, convex beneath, with a longitudinal groove, flat above, entire, imbricate, smooth, scarcely a line in length: the flowers solitary, nodding, on pubescent reflex peduncles large and white. It is a native of Africa. This is one of the most beautiful plants of this beautiful genus.

The eleventh species has a frutescent stem, determinately branched, with white, awl-shaped, decurrent lines under the scars of the leaves; which are linear, even, pressed close, scarcely longer than the interstices: the flowers terminating, subumbelled, on peduncles the length of the flowers. It is a native of the Cape of Good Hope.

In the twelfth the stem is flexuose-erect, ash-coloured, two feet high: the branches opposite, or in threes, cinereous-villose, wand-like: branchlets filiform, scattered, frequent, wand-like: the leaves are in threes, linear-lanceolate; beneath grooved from the revolute margins, tomentose-whitish, from erect spreading, curved a little: the flowers flesh-coloured. It is a native of the Cape of Good Hope, flowering in May and June.

It varies with flowers very hirsute and hairy, red, and whitish flesh-coloured.

The thirteenth species has the leaves three-fold oval, downy-white underneath: the flowers ovate, conic. It is a native of the Cape of Good Hope.

In the fourteenth the branches are round and

smooth: branchlets pubescent: the leaves linear-awl-shaped, grooved, spreading, half an inch long, on appressed petioles scarcely half a line in length: the flowers axillary, and of a deep red colour. It is a native of the Cape, flowering at various seasons.

The fifteenth species has the branches filiform, ramentaceous, long, ferruginous: the leaves very narrow, upright, pressed close: the flowers umbelled, of a purple colour. It is a native of the Cape of Good Hope, flowering in July.

The sixteenth has the stem shrubby, smoothish, with pubescent branches: the leaves linear, obtuse, erect, channelled underneath, the length of the joints, hispid or subscabrous: the flowers are umbelled, dispersed on the upper twigs, and of a flesh-colour. It is a native of the Cape, flowering from February to May.

The seventeenth has a brown stem, smooth below, hispid at top, erect, a foot high: the branches dichotomous, brown at bottom, and smooth, above ash-coloured, hirsute, erect, fastigiate: branchlets scattered all over the branches, filiform, frequent, hairy-rough, wand-like: the leaves are linear-subulate, entire, smooth, flat above, convex beneath, with a very slender groove, incurved, from erect spreading: the flowers solitary, or two or three together, on very short drooping peduncles, ash-coloured, tomentose. It is a native of the Cape.

The eighteenth species has an erect stem, branched: the leaves linear, bluntnish, rugged on the edge, longer than the internodes, on white petioles: the flowers terminating, in threes, or thereabouts, nodding, the size of a pea, on purple peduncles, with alternate, remote, flesh-coloured bracts. It is a native of the Cape, flowering in April and May.

The nineteenth has a shrubby, compound stem: the leaves linear, smooth: the flowers terminating, sessile, of a purple colour. It is a native of the Cape, flowering in August.

The twentieth species has a brown, rugged stem, a foot high: the branches in whorls, like the stem, flexuose-erect: branchlets trichotomous and dichotomous, like the branches: the leaves in sixes, oblong, obtuse, incurved, above three-cornered, flat, beneath grooved, rugged, especially underneath, very finely ciliate, imbricate, a line in length: the flowers aggregate, in whorls, in the middle and at the ends of the branchlets of a blood-red colour. It flowers in April and May.

The twenty-first species has the stem seldom erect, commonly decumbent, smooth, flexuose, filiform: the branches filiform, flexuose, villose: branchlets capillary, frequent, tomentose: the leaves ovate, spreading, rough, with long hairs:

the flowers at the ends of the extreme branchlets, peduncled, one, two, or three together, the whole calyxes covered close with a white wool.

The twenty-second has the leaves linear, even the upper ones, ciliate: the flowers terminating, solitary, sessile, of a purple colour.

The twenty-third species has the leaves four-fold, smooth, and long yellow flowers. It flowers from May to August.

The twenty-fourth has the branches compound: the leaves oblong, convex, even, grooved underneath, ciliate, with spinules: the flowers large, heaped on the side into a sort of head, sessile, pubescent: calyx rough, with white hairs, as it were doubled: the corolla bright blood red, rough with white hairs, having the mouth obscurely four-cleft. It is a native of the Cape, flowering most part of the year.

The twenty-fifth species has the branches heaped above the flowers: the leaves linear, bluntish, erect: the flowers heaped, lateral, below the top of the stalk. It is a native of the Cape.

The twenty-sixth species has shrubby filiform stems, covered all round with leaves: the leaves in fours, imbricate in eight rows, very short, elliptic, crowded, obtuse, ciliate, so that they appear villose: the flowers red, in a terminating sessile head. It is native of the Cape.

The twenty-seventh has the leaves linear and crowded: the flowers peduncled, and nodding. It is a native of the Cape.

The twenty-eighth species is a brown shrub: the branches covered with branchlets in threes, crowded, very short, pubescent, clothed with squarrose leaves; which are also crowded, awl-shaped, subtrigonal, somewhat rugged at the edge, patulous, or standing out at the tip: the flowers solitary, at the ends of the branchlets, drooping, on a short, pubescent peduncle, of a red colour. It is native of the Cape, flowering from January to March.

The twentieth species is a small shrub, from a foot to eighteen inches in height, decumbent at bottom, then upright, branched, flexible: the leaves are almost covering the whole stem, deciduous, resembling those of the fir, thickish, having a prominent nerve, narrow, very sharp, smooth: the flowers at the tops of the branchlets, on short peduncles, alternate, among the leaves: they come out in autumn, continue closed during winter, and are then green; in May the year following the flowers are unfolded; the anthers which were inclosed are protruded, the calyx and corolla, opening, are both changed into a pale purple or flesh-colour. It is a native of Austria.

The thirtieth species has the leaves linear, four-folded: the flowers large and yellow. It is a native of the Cape, flowering from May to July.

Culture.—These elegant plants must be treated in different methods, according to their nature.

The first three British sorts are capable of being propagated by sowing the seeds, either in the places where they are to remain, or in pots filled with peaty earth in either the autumn or spring seasons, but this is a tedious practice. The best method is, to take them up from the places where they grow naturally in the early autumn, with good balls of earth about their roots, planting them again immediately where they are to grow.

They succeed best where the soil is of the peaty or moory kind, and where it has not been enriched by manure; and as they protrude their roots chiefly near the surface, it should be as little dug about them as possible.

The four following sorts may be increased in the same manner as the former; but the best practice is by layers, cuttings, or slips, which should be laid down or planted out in pots filled with boggy earth, either in the early spring or the latter end of summer, plunging them in a moderate hot-bed, giving them proper shade and water. When they have taken full root, they should be removed with balls of earth about them into separate pots, being replaced in the hot-bed till they become well established, when they will be capable of bearing the open air in mild weather.

All the other species may be increased either by cuttings or layers, but most of them by the former. The cuttings should be made from the best young shoots, and be planted in the spring season in pots filled with a composition of light boggy and loamy earth, being placed in the hot-bed, and covered with bell-glasses, and duly shaded from the sun, slight waterings being given when necessary; the layers are best made in the autumn, being managed in the same way.

When the plants are perfectly rooted, they may be removed into separate pots filled with the same sort of earth, and placed in the dry, stove or green-house, where many of the plants must constantly be kept.

The ninth, twentieth, and twenty-sixth species must, however, be raised by layers, as they have not yet been increased by planting their cuttings.

When seeds are made use of in producing these plants, they should be sown in pots filled with the above sort of earth, in the early spring, and plunged in the hot-bed of the stove. When the plants have acquired a few inches growth, they should be removed into single pots with a little earth about their roots, and be replunged in the hot-bed in the stove, being preserved in it, or the warmest part of the green-house, during the winter.

The first three sorts afford an agreeable variety in the borders and clumps, as they continue long in flower. The four following kinds are likewise hardy, and afford variety among other potted plants in the open air during the summer.

The other species are more tender, but produce an agreeable effect among the stove and green-house collections, from the great beauty and continuance of the flowers in many of the sorts.

ERIGERON, a genus comprising plants of the hardy herbaceous perennial kind.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositae Discoideae*.

The characters are: that the calyx is common oblong, cylindric, imbricate: scales subulate, upright, gradually longer, nearly equal: the corolla compound rayed: corollets hermaphrodite, tubular in the disk; females ligulate in the ray; proper of the hermaphrodite funnel-form; border five-cleft: of the female ligulate, linear, subulate, upright, commonly quite entire: the stamina in the hermaphrodites have five filaments, capillary, very short: anthers cylindric, tubular: the pistillum in the hermaphrodites has the germ very small, crowned with a down longer than its corollet: style filiform, length of the down: stigmas two, very slender: there is no pericarpium: calyx converging: the seeds in the hermaphrodites oblong, small: down long, hairy: of the females extremely like the hermaphrodites: the receptacle naked, and flat.

The species mostly cultivated are: 1. *E. viscosum*, Clammy Erigeron; 2. *E. Canadense*, Canadian Erigeron; 3. *E. purpureum*, Purple Erigeron, or Labrador Aster.

Other species may be cultivated for variety.

The first has an upright, stiff stem, near three feet high, striated, hairy, viscid, branched from the very bottom: the leaves thick, rough with hairs, having glands between them exuding a clammy juice, strong smelling, bent down at the base, rounded and stem-clasping: on the branches linear, entire, four inches long and two broad: the peduncles two-leaved, one-flowered; scarcely longer than the leaves: flowers radiate, of a yellow colour; appearing in July, and affording an agreeable smell. It is a native of the South of France, &c.

The second species has an annual root: the stem firm, hairy, sometimes three or four feet high, frequently crooked, much branched towards the top, and even from the middle: the branches gradually shorter, and forming a long cone: the lower leaves oval, tapering to a foot-stalk, with large blunt distant teeth; higher up lanceolate, distinctly serrate, (or entire) slightly hairy on the upper, but more so on the

lower surface, those on the branches and at their base linear-lanceolate, entirely sessile: flowering-heads numerous, on simple or branched slender peduncles. It came originally from North America, flowering in August. It is sometimes called White Golden Rod.

The third has a perennial root: the stem herbaceous, branched, a foot or more in height: the leaves alternate, sharp, either entire, or with a few teeth about the edge: the flowers panicled: leaflets of the calyx lanceolate, sharp, unequal, smooth, slightly keeled; the keel having a few hairs scattered over it: corollets of the ray very numerous, purple; of the disk yellow. It is a native of Hudson's Bay, flowering in July and August.

Culture.—These plants may be increased by sowing the seeds in patches, in the perennial sorts in the autumn, and the annual ones in the spring, in the borders, clumps, or other parts where the plants are to remain. They should afterwards be kept free from weeds, and be properly thinned.

The perennial kind may likewise be increased by off-sets or slips from the roots, which should be planted out in the autumn, where the plants are to continue.

The first kind requires a dry soil and sunny exposure. The perennial sort flowers the second year.

They are plants which afford ornament and variety among others of the flowering kind.

ERINGO. See ERYNGIUM.

ERINUS, a genus comprising plants of the herbaceous and shrubby perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatae*.

The characters are: that the calyx is a five-leaved perianthium: leaflets lanceolate, upright, nearly equal, permanent: the corolla one-petalled, unequal: tube ovate-cylindric, length of the calyx, bent back: border flat, five-parted: divisions equal, obcordate: the stamina have four filaments, very short, within the tube of the corolla, of which the two opposite ones are a little longer: anthers small: the pistillum is a somewhat ovate germ: style very short: stigma headed: the pericarpium is an ovate capsule, rolled up in the calyx, two-celled, gaping two-ways: the seeds numerous and small.

The species are: 1. *E. Alpinus*, Alpine Erinus; 2. *E. fragrans*, Sweet-smelling Erinus.

Other species may be cultivated for variety.

The first has a perennial root: the root-leaves form a thick tuft close to the ground, are all linear-spatulate, pubescent, with a few serratures at the end on both sides: the leaves on the stem

alternate, of a dark green colour: stems many, very simple, a hand high, round, pubescent, upright; the side-ones barren and decumbent: flowers alternate, of a purple colour, separated by leaves like those on the stem, but smaller, and forming an upright, simple raceme. They appear in May, or earlier. It is a native of Germany.

The second species has a simple stem: leaves alternate, from the axils; spike long with the flowers remote; corollas tomentose on the outside, of a dark colour, fragrant at night. It is a native of the Cape.

Culture.—The first sort may be increased by parting the roots, and planting them where they are to remain in the early autumn. They succeed the most perfectly in situations where the soil is a loamy sand and not enriched by the application of manure, as under other circumstances they are apt to rot, and be destroyed.

The second kind may be increased by planting cuttings of the young shoots early in the spring or summer months, in pots of fresh light earth, plunging them in the hot-bed of the stove. When they are well rooted, they should be removed into separate pots and placed in the greenhouse, where they must be constantly kept, and have a pretty free admission of air as well as frequent slight waterings.

They are plants that afford variety in the different situations where they grow. The first is a very desirable little plant for the decoration of rock-work, as it grows in close tufts, and produces numerous lively purple flowers during most of the summer season.

ERIOCEPHALUS, a genus containing a plant of the shrubby evergreen kind.

It belongs to the class and order *Syngenesia Polygamia Necessaria*, and ranks in the natural order of *Compositæ Nucamentaceæ*.

The characters are: that the calyx is common upright: scales ten, ovate, equal, converging, of which the five exterior are keeled, the interior flat: the corolla compound rayed: corollules hermaphrodite twice as many as in the disk: females five in the ray: proper of the hermaphrodite funnel-form; border five-cleft, patulous: of the ray ligulate, obcordate, with three-lobed, equal tips: the stamina in the hermaphrodites consist of five filaments, capillary, very short: anthers cylindric, tubular: the pistillum in the hermaphrodite is a very small germ, naked: style simple; stigma two-cleft, sharp: in the females, germ ovate, naked: style simple, stigma acuminate, inflex: there is no pericarpium: calyx scarce changed: there is no seed to the hermaphrodites: females solitary, obovate, naked: the receptaculum naked, flat; or else a down of

the calyx in a double row is interspersed both between the hermaphrodite and female floscules.

The species are: 1. *E. africanus*, Cluster-leaved Erioccephalus; 2. *E. racemosus*, Silvery-leaved Erioccephalus.

The first has a shrubby stalk, from four to six feet high, putting out many side-branches the whole length: the leaves are woolly, coming out in clusters, some taper and entire, others divided into three or five parts, which spread open like a hand; they have a strong smell when bruised approaching to that of Lavender Cotton: the flowers are produced in small clusters at the ends of the branches, and stand erect: the female florets composing the ray form a hollow, in the middle of which the hermaphrodite florets forming the disk are situated: the border is white, with a little reddish cast on the inside, and the disk is of a purplish colour. It flowers from January to March.

The second species has the stature and appearance of the first, but all the leaves are undivided: the flowers are on pedicles shorter than the calyx: outer scales of the calyx four, ovate, subtomentose, with a very soft wool from the bosom of them. It flowers in March and the following month.

Culture.—These plants may be raised by layers or cuttings of the young shoots. The former should be laid down in the early autumn or spring, and the latter planted during the summer, in pots filled with light earth, and plunged in a moderate hot-bed, being shaded till they become well rooted, and frequently refreshed by small waterings. When the layers or cuttings have stricken root perfectly, they should be taken off, or removed into separate pots, and placed in an airy situation in the greenhouse to prevent their being drawn up too much; afterwards they may be set out in the open air in a warm aspect till the approach of autumn, when they must be removed into the greenhouse again, and placed so as to have much sun and free air when the weather is mild, carefully guarding them against frost and moist air.

They should be very sparingly watered in winter, but when in the open air in summer it will be frequently necessary.

From their retaining their leaves all the year, they have a very ornamental effect in winter.

ERYNGIUM, a genus containing plants of the hardy flowering biennial and perennial kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is a common conic receptacle, chaffs separating the sessile floscules: involucre of the receptacle many-leaved, flat, exceeding the floscules: perianthium proper

five-leaved, upright, sharp, exceeding the corolla, seated on the germ: the corolla universal, uniform, roundish: floscules all fertile: proper five-petalled: petals oblong, the tips bent inwards to the base, straightened longitudinally by a line: the stamina consist of five capillary filaments, straight, exceeding the floscules: anthers oblong: the pistillum is a hispid inferior germ: styles two, filiform, straight, length of the stamens: stigmas simple: the pericarpium is an ovate fruit, divisible in two directions: the seeds oblong, and columnar.

The species cultivated are: 1. *E. foetidum*, Stinking Eryngo; 2. *E. planum*, Flat-leaved Eryngo; 3. *E. maritimum*, Sea Eryngo, or Sea-Holly; 4. *E. amethystinum*, Amethystine Eryngo; 5. *E. alpinum*, Alpine Eryngo.

The first has an annual or biennial root. The root-leaves bluish; the serratures terminating in harmless spines. The stem a foot high or more, green, somewhat angular, dichotomous, spreading; with the extreme branches flexuose. The leaves on the branches opposite, stem-clasping, wedge-shaped, subconnate, with the edge toothed and semitrid; the divisions lanceolate, all the angles terminating in a purplish spine. The peduncle springs from the angles of the stem; it is straight, shorter than the internode, triangular, streaked on the sides. The involucre is composed of six leaflets or thereabouts; are horizontal, and longer than the flower; the leaflets are lanceolate, nerved, and have a spine at the tip and at one or two of the serratures. The common receptacle is cylindric, whence the flower is cylindric. It is of a dull white colour, appearing at the divisions and extremities of the branches. The whole plant has a very penetrating, strong, but not unsavoury smell. It is a native of Virginia, flowering in June and July.

The second species has a perennial root. The stem upright, round, furrowed or streaked, whitish, about a foot and half in height, blueish at top, where it divides into three parts, each of which is terminated by a peduncled axillary flower. Lower leaves cordate ovate, obtuse, on long petioles, with unequal, mucronate notches about the edge; stem-leaves sessile; the uppermost lobed, ga-hed, smaller serrate, the notches spinulose. The flowers in terminating heads, fenced with a six-leaved involucre, spreading and reflex. It is a native of Austria, &c. flowering in July.

There is a variety with white stalks and flowers.

The third has a creeping root, running deep into the ground. The leaves roundish, stiff, gray, set with sharp spines on the edges. The stems

a foot high, branched, smooth, having at each joint leaves of the same form with the lower ones, but smaller. The flowers come out at the ends of the branches in roundish prickly heads, and are of a whitish blue colour; under each head is a range of narrow, stiff, prickly leaves, spreading like the rays of a star. The flowers appear in July. It is a native of Britain, &c. The young flowering-shoots when eaten as asparagus are very grateful, and of a nourishing quality.

The fourth species has the lower leaves divided like the fingers of a hand, into five or six segments, which are very much cut at their extremities into many parts, and have small spines. The stem is about two feet high, with smaller and more divided leaves. The upper part of the stem, and also the heads of flowers, are of the finest amethystine colour, making a fine appearance. It is a native of Styria, flowering in July.

The fifth species has a perennial root. The leaves are cordate and toothed, the lower on long petioles, the upper stem-clasping. The lower leaves resemble those of *Cacalia*, but are more acute, and the teeth end in a soft spine. Amethystine leaves surround the oblong head of flowers; some of them bristle-form and reflex, others pinnatifid and lanceolate. It is curious, according to Villars, on account of the beauty of the involucre, which are of a vinous azure blue, mixed with green and white. It is a native of Switzerland, &c.

Culture.—Some of these plants may be increased by seed, and the others by planting their creeping roots.

The first, second, fifth, and sixth sorts are raised by sowing the seeds, in the first on a hot-bed or in pots plunged into it, but in the others in the autumn, in the places where the plants are to grow.

When the plants have attained some growth, in the first kind, they should be removed into separate small pots, filled with light, fresh, fine mould, and replunged into the bark hot-bed, being afterwards managed as other exotic plants of the tender kind. The plants usually flower the second year, and then die. In the other species all the culture that is required after the plants appear is that of thinning them properly, keeping them free from weeds, and digging the ground about them in the early spring season.

The third species must be increased by planting portions of the creeping roots of the young plants in a dry gravelly soil in the autumn, as soon as the stems decay. They grow the largest and most fleshy in the root in such situations as are occasionally overflowed by the sea-water.

They afterwards only require the culture of being kept free from weeds.

They are all proper for being introduced in the borders or other parts of pleasure-grounds for variety, except the first, which requires the protection of the stove.

ERYSIMUM, a genus furnishing a plant of the flowery perennial kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Siliquosæ*.

The characters are: that the calyx is a four-leaved perianthium: leaflets ovate-oblong, parallel-converging, coloured, deciduous: the corolla is four-petalled, cruciform: petals oblong, flat, extremely obtuse at the tip: claws length of the calyx; upright: gland nectariferous double, within the shorter filament: the stamina consist of six filaments, length of the calyx; of these the two opposite shorter: anthers simple: the pistillum is a linear germ, four-cornered, length of the stamens: style very short: stigma headed, permanent, small: the pericarpium is a long siliqua, linear, strict, exactly four-cornered, two-valved, two-celled: the seeds very many, small, and roundish.

The species principally cultivated is *E. Barbarea*, Winter Hedge Mustard, Cress, or Yellow Rocket.

It has a perennial root. The stem a foot or eighteen inches high, smooth, round, deeply furrowed, much branched. The leaves smooth, dark green, having two or three pairs of roundish lobes, connected to a broad foliaceous rib; the extreme lobe much the largest, and either of an oval or blunt rhomboidal figure, slightly indented on the edges; but varying much in form. The flowers are in racemes or thick spikes at the ends of the stem and branches, of a yellow colour. It is sometimes cultivated for spring salad, under the name of French or American Cress.

It varies with double flowers, which is the Double Yellow Rocket.

Culture.—These plants may be readily increased by sowing the seeds in the autumn or spring in the places where they are to remain, afterwards keeping them properly thinned, and clear from weeds.

The double variety may be propagated by offsets or slips from the roots, planted out in autumn.

This species is sometimes sown as a warm spring salad herb.

The double variety is employed as an ornamental plant in the borders, &c.

ERYTHRINA, a genus comprising plants of the herbaceous and shrubby exotic kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, entire, tubular: mouth emarginate above; beneath furnished with a melliferous pore: the corolla papilionaceous, five-petalled: standard lanceolate, with sides bent back, ascending, very long: wings somewhat ovate, scarce longer than the calyx, scarce projecting beyond the tube of the standard, very small: keel straight, length of the wings, two-petalled, emarginate: the stamina consist of ten filaments, conjoined at the lower part, but little bent in, the length of half the standard, unequal: anthers ten, sagittate: the pistillum is a pedicelled germ, subulate, attenuated into a subulate style the length of the stamens: stigma terminal, simple: the pericarpium is an extremely long legume, protuberating at the seeds, terminated by a point, one-celled: the seeds kidney-form.

The species chiefly cultivated are: 1. *E. herbacea*, Herbaceous Coral-Tree; 2. *E. carnea*, Flesh-coloured Coral-Tree; 3. *E. Corallodendron*, Smooth-leaved Coral-Tree; 4. *E. picta*, Prickly-leaved Coral-Tree.

The first has a large woody root, from which fresh shoots come out every spring, growing to the height of about two feet, which seldom throw out branches, and are sometimes perennial. The leaflets are hastate, deep green; the upper part of the stalks terminated by a long bunch or spike of scarlet flowers. The legumes five or six inches long, containing five or six scarlet seeds. It flowers in September, but never produces seeds in this climate. It grows naturally in South Carolina.

In the second species the seeds are not half so large as those of the third, and are of a bright scarlet colour; the leaves are also much smaller, and have long acute points; the branches are very closely armed with crooked greenish spines, as are also the ribs and foot-stalks of the leaves. The flowers grow in very long close spikes, and are of a beautiful scarlet colour. It is a native of La Vera Cruz.

The third has a thick woody stem, which rises about ten or twelve feet high in this climate, but where it is a native to twice that height, sending out many strong irregular branches, which are covered with a brown bark. The leaves are on long foot-stalks; the middle leaflet much larger than the other two; they are all heart-shaped, smooth, and of a deep green colour. The flowers come out at the ends of the branches, in short thick close spikes; are of a deep scarlet colour, and make a fine ap-

pearance; are mostly in beauty in May and June, but not succeeded by pods here: in America they have thick swelling crooked pods, containing large seeds of a reddish purple colour. The leaves fall off in spring, and new ones are put forth in autumn, which continue green all the winter; but the flowers do not appear till the leaves are shed.

The fourth species has shrubby branched stalks, seldom above eight or nine feet high, armed in every part with strong crooked black spines. The leaves are smaller than those of the preceding, and have a nearer resemblance to the first; the foot-stalks are armed with the same sort of spines, and the midrib has also some which are smaller, and not so black: the flowers are of a paler scarlet, and grow in looser spikes. The seeds are as large as those of the third sort, but of a dark purple colour. It is usually planted in the East Indies as a support to Pepper plants.

Culture.—These plants may all be raised by sowing the seeds, obtained from their native situations, in pots filled with light good mould, in the early spring, plunging them in a moderate hot-bed. When the plants have attained an inch or two in growth they may be shaken out of these pots, and planted in separate small pots of the same sort of earth, re-plunging them in a mild bark hot-bed, giving them proper shade, air, and water during the summer; but keeping them in autumn in the stove. As the plants advance in growth they must be removed into larger pots.

They are likewise capable of being increased by planting cuttings of the young shoots in pots of light earth during the summer season, plunging them in the hot-bed. The seedling plants are however the strongest.

They afford ornament and variety among collections of other stove plants.

ERYTHRONIUM, a genus consisting of a plant of the low flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceae*.

The characters are: that there is no calyx: the corolla has six petals, oblong-lanceolate, acuminate, alternately incumbent towards the base, gradually more spreading, from the middle bent backwards: nectaries two: tubercles obtuse, callous, growing to each alternate and interior petal near the base: the stamina consist of six subulate filaments, very short: anthers oblong: the pistillum is a turbinate germ: style simple, shorter than the corolla, straight: stigma triple, spreading, obtuse: the pericarpium is a somewhat globose capsule, narrower at the

base, three-celled, three-valved: the seeds are very many, ovate, acuminate.

The species is *E. Dens canis*, Dog-tooth Violet.

It has two ovate leaves joined at their base, three inches long, and one inch and a half broad in the middle, gradually lessening towards the ends; these at first embrace each other, inclosing the flower, but afterwards spread flat upon the ground; are spotted with purple and white all over their surface. Between them rises a single, smooth, purple, naked stalk, about four inches high, sustaining one flower of a purple colour, which hangs down. The roots are white, oblong, and fleshy, shaped like a tooth. It grows naturally in the south of France.

There are varieties with longer and narrower leaves, and the flowers a little larger, but not so well coloured; with darker green leaves, and pale yellow flowers; and with white flowers.

Culture.—The plant may be increased by planting off-sets from the roots, in shady situations, where the soil is of a loamy quality, in the latter end of the summer, after the stems are decayed, in patches of several together. They should not be too often removed, or kept long out of the ground.

They have a good effect in the fronts of borders, &c. as early flowering plants.

ESCULENT PLANTS, all such as are eatable, and cultivated in the kitchen-garden for the purpose of food, whether of the root, bulb, or herb kinds.

ESPALIER TREES, such fruit-trees of low growth as are trained to treillages or framed wood-works for the purpose, in ranges, so as to constitute a sort of hedge. They are usually planted in single rows along the borders, on the sides of the principal walks, in the main divisions of the garden, affording shelter to other plants as well as ornament.

The sorts of fruit-trees mostly employed in this way are those of the apple, pear, and plum kinds; but many others may be managed in this method, where variety is wanted; as the quince, cherry, almond, apricot, mulberry, and filbert. And it is necessary, with a view to beauty and uniformity, to manage them in such a manner as to have those that are nearly of the same growth in the same range or line.

The sorts of apple most adapted to this use are those of the golden and other pippin kinds, the nonpareil, rennet, and russet.

In the pear kind, the jargonelle, blanquette, bergamot, burre du Roy, &c. the *melting* pears being always better in this way than those of the *breaking* kind. On strong moist soils those grafted on *quince* stocks are the best, but on dry ones those on *free* stocks.

Trees intended for this use should be grafted or budded within a few inches of the surface of the ground, that branches may be thrown out regularly from the bottom upwards, to furnish and fill the treillage; and the more effectually to accomplish the purpose, the first shoots from the grafts, &c. should be cut off, or headed down, within a few inches of the grafts, in the spring season, when they have had one year's growth. The branches or shoots thus produced, whether the trees are in the nursery, or planted out as espaliers, should in the latter part of the summer, or beginning of autumn, be trained both ways laterally in their advancing growth, to stakes put down for the purpose, or the espalier frames. In this way the trees acquire a proper form, those in the nursery being thus trained and kept for sale. A second heading down in the upper branches may likewise be practised when necessary, in order to fill up the middle, and completely cover the frames.

When these trees have been thus trained for three or four years in the nursery-ground, they are generally in a proper situation for being planted out as espaliers in the borders or other parts along the sides of the walks in the garden or pleasure-grounds, a sufficient breadth being allowed for the borders, according to the size or extent of such grounds, as six, eight, ten, or more feet.

Besides this, there is another method sometimes practised in forming espalier trees, which is that of, after heading the first shoots down as above, training the side-shoots horizontally in the direction of the frames, and the middle one upright, forming the lateral shoots, which it throws out horizontally on each side; and, if they are not thrown off sufficiently low, heading the upright one down, by which lateral branches will be sent off, so as to range with regularity at the distance of six or seven inches, one above another, on each side, from the bottom to the top. In this way the trees have a very neat appearance.

In planting the trees out, when they are of the apple or pear kind, on dwarf stocks, the distance in the rows should be fifteen, eighteen, or twenty feet; and when on free stocks, not less than twenty or thirty, and for free growing trees considerably more. For plums, the distance should be eighteen feet or more; and for cherries, apricots, almonds, and mulberries, it should never be less than fifteen. Considerably less distance will however be sufficient for filberts, especially in the poorer sorts of soil.

When these trees have been planted, it is the usual practice to put stakes down in a line to train them to for the two or three first years;

but it has a much neater appearance to have the treillage fixed down to train them to at once.

Frames for this use are made in different ways, according to the taste of the person who has them; but the most usual sort are those constructed of three or four inches square pieces of oak timber for the posts, with rails of deal carried from post to post, at the distance of every ten or twelve inches from the bottom to the top. Between these rails thin upright pieces are again sometimes fixed at the same distances, for particular purposes. The whole should be well painted over in oil some time before the trees are to be trained to it. This last is performed either by tying the branches to the trellis by osier twigs, woollen-yarn, or other similar substance, or by nailing them in the manner of wall-trees. In whichever way it is done, the greatest exactness and regularity should be observed in laying in and directing the shoots.

The manner of performing the future pruning and managing of these trees will be explained when we come to speak of the nature of pruning in general. See PRUNING OF FRUIT-TREES.

These sorts of trees are chiefly advantageous in admitting the branches to produce fruit spurs on both sides, which is not the case with wall-trees; in taking up but little room in the garden; in not being so injurious to the crops that are near them; in affording fruit of a finer flavour, from the more free admission of air and sun, and in the fruit not being so liable to be blown down and injured.

ETIOLATION OF PLANTS, the rendering them white, crisp, and tender, by excluding the action of light from them. See BLANCHING.

EVERGREEN TREES, such trees, whether of tall or shrubby growth, as constantly retain their leaves during the whole year. There are a great number of this sort of plants, which will be particularly described under their proper genera.

These kinds of trees, shrubs, &c. are increased in different modes, according to their particular nature, as by seeds, layers, cuttings, suckers, &c. which is fully shown under the culture of the different sorts, but principally in the spring season, though occasionally in the summer, and frequently in the early autumn.

The proper seasons for planting them out are the early autumn or later spring months, according to the nature of the soil. Where the soils are of the more stiff, retentive, moist kind, the more advanced spring months are the best; but where they are of the light dry loose description, the beginning of the autumn is the

most proper period; as in the former case the plants will be in no danger of being injured by stagnant moisture in the winter, and in the latter there will be no risque of their being destroyed by the heat and dryness of the summer, before they become perfectly established.

In the planting of Evergreens it is seldom necessary to put them in to any great depth, as they are very liable to be destroyed by deep planting. There is likewise another circumstance that ought to be regarded, which is that of having the mould in which they are to be set sufficiently fine, and the roots well bedded in it, without being much cut in or retrenched. In all cases the loose mould should be well trodden in about them; and the more tall growing kinds well supported with strong stakes, so as to keep them perfectly steady in their situations. Numbers of trees of this as well as other sorts are destroyed for want of attention in this respect.

The pruning or cutting in of this sort of trees, where it is necessary, should be performed either in the more advanced spring season, or the latter part of the summer, but never in the winter season, as they are liable to much injury from cold. This is equally necessary to be regarded in the clipping of hedges constituted of plants of this sort.

Many of these sorts of trees and shrubs are sufficiently hardy to admit of being planted in most sorts of soils and situations. The tall-growing kinds are well adapted for affording ornament and variety in mixture with those of the deciduous class in extensive plantations, and such as are of a shrubby growth in the borders, clumps, and other parts of ornamented grounds. In these situations they should be suffered as much as possible to take their natural growth, especially the fir kinds, and in the others only very little cut in, and the dead wood removed.

In the forming of hedges various plants of this sort are employed; but the best are those of the holly, yew, evergreen privet, and box kind; though the common laurel and laurustinus may be the most advisable where they are required to be lofty. These are likewise capable of being trained so as to cover naked walls, palings, or other unpleasant objects. Hedges formed of these plants should be clipped in once or twice during the summer season, so as to keep them in perfect neat order.

Various ornamental devices were formerly made with these and other sorts of evergreens in gardens; but these are at present little in use, as a better and less troublesome taste prevails.

It has been remarked by the author of "The Philosophy of Gardening," that in these sorts of

trees and shrubs, the buds rise in the bosoms of the leaves, which, as they are not shed in the autumn, they continue to oxygenate the juice of the plants, and supply nutriment to the buds during the fine days in the winter and spring seasons, surviving till nearly the middle of summer, when the new buds have expanded leaves of their own. It is hence conjectured that evergreens provide no store of nourishment in their roots or alburnum in the summer for the support of their ensuing vernal buds, and of course have probably no bleeding season, as is the case with those of the deciduous kind.

There is another circumstance which has been stated by Dr. Milne, in his Botanical Dictionary, to take place in respect to evergreens, which is, that when they are engrafted on those of the deciduous sort, it determines the latter to retain their leaves. This is asserted to be confirmed by repeated experience, in grafting the laurel, *lauro-cerasus*, an evergreen, on the common cherry, *cerasus*, and the *ilex*, an evergreen oak, on the common oak.

EVERGREEN THORN. See *MESPILUS PYRACANTHA*.

EVERLASTING. See *GNAPHALIUM*.

EVERLASTING PEA. See *LATHYRUS*.

EUGENIA, a genus containing plants of the exotic shrub or tree kind.

It belongs to the class and order *Icosandria Monogynia*, and ranks in the natural order of *Hesperideæ*.

The characters are: that the calyx is a one-leaved superior perianth, elevated in the middle into a subvillose little ball, four-parted; divisions oblong, obtuse, concave, permanent: the corolla has four petals, twice as large as the calyx, oblong, obtuse, concave: the stamina have very many filaments, inserted into the ball of the calyx, length of the corolla: anthers small: the pistillum is a turbinate, inferior germ: style simple, length of the stamens: stigma simple: the pericarpium is a four-cornered drupe, crowned, one-celled: the seed a roundish, smooth nut.

The species cultivated are: 1. *E. malaccensis*, Broad-leaved Eugenia; 2. *E. jambos*, Narrow-leaved Eugenia; 3. *E. uniflora*, One-flowered Eugenia.

The first, in its native situation, rises with a tree-like stem, from twenty to thirty feet high, covered with a brown bark, and sending out many branches. The leaves are oblong, ending in acute points, opposite; when young of a bright purple colour, but as they grow older becoming of a light green. The flowers are produced on the sides of the branches; every peduncle branching into three or four others,

each of which supports one flower: the fruit succulent, irregularly shaped, and inclosing a single nut of a roundish form, commonly obtusely quadrangular; but sometimes ovate, an inch and half in diameter, fleshy, very sweet, smelling like the rose, covered with a thin shining yellowish skin; and commonly containing one large seed, roundish, and softish, but not bony: the fruit is very agreeable to the taste, smell and sight, and esteemed wholesome. Forster describes it as whitish, tinged with rose-colour, pear-shaped, and sometimes as big as the fist, but usually much smaller. It is common in the islands in the South Sea.

The second species rises to the same height, but the leaves are longer and narrower: the flowers terminating, but some come out from the sides, greenish yellow: the fruit smaller, rounder, pear-shaped, white and red, and not so much esteemed. It is a native of the East Indies, &c. flowering from May to July.

The third species has solitary peduncles: the flowers are white: fruit bright red, soft, slightly grooved, and having a sweet smell. First brought from Goa.

Culture.—These plants may be propagated by setting the stones of the fruit as soon as procured from the places where they grow naturally, in pots filled with light mold, plunging them in the hot-bed, and keeping the earth about them constantly moist, but not too wet.

When the plants have attained five or six inches growth, they should be carefully removed and placed in separate pots of a small size, replunging them in the hot-bed, due shade being given till they are well rooted again. They afterwards require to be managed as other tender plants of the same nature, to be retained constantly in the stove, and to have but little water in the winter season.

They may likewise be sometimes raised by laying down the young shoots under the same circumstances.

They afford variety in stove collections among other curious exotic plants.

EUONYMUS, a genus comprising plants of the hardy flowering shrubby kind.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Dumoseæ*.

The characters are: that the calyx is a one-leaved, five-parted, flat perianthium: divisions roundish, concave: the corolla has five petals, ovate, flat, spreading, longer than the calyx: the stamina consist of five subulate filaments, upright, shorter than the corolla, placed on the germ as it were on a receptacle: anthers twin: the pistillum is an acuminate germ: style short, simple: stigma acute: the pericarpium is a

succulent capsule, coloured, five-sided, five-cornered, five-celled, five-valved: the seeds solitary, ovate, involved in a berried aril.

The species cultivated are: 1. *E. Europæus*, Common Spindle-Tree; 2. *E. latifolius*, Broad-leaved Spindle-Tree; 3. *E. verrucosus*, Warted Spindle-Tree; 4. *E. atro-purpureus*, Purple-flowered Spindle-Tree; 5. *E. americanus*, Evergreen Spindle-Tree.

The first is a shrub; but if planted singly, and properly trained, it will rise more than twenty feet high, with a strong woody stem dividing into many branches: the leaves are lanceolate, about three inches long, and an inch and quarter broad in the middle, opposite, entire, of a deep green colour: the flowers come out at the end of May or the beginning of June, in small bunches from the side of the stalks on slender peduncles: the petals are whitish, and spread in form of a cross: the fruit ripens in October, when the seed-vessels spread open and expose the seeds, which being of a beautiful red colour render the appearance of these shrubs very fine.

The second species rises with a stronger stem than the first, and grows to a larger size: the leaves are ovate-lanceolate, about four inches long, and two broad in the middle, opposite, entire, light green, on short foot-stalks: the flowers come out from the side of the branches, upon very slender peduncles, two inches and a half long, branching out into a loose bunch, and the flowers on separate pedicles, of a purplish colour: the fruit is much larger than in the common sort, and always hangs down. It is a native of Austria, &c.

The third differs from the two former in having the stem and branches warted, the upper surface of the petals covered with a pile consisting of very small teats: the anthers rounded, and placed upon their pyramidal filaments like the cap of a mushroom; a raised tubercle supporting each filament: the receptacle variegated, with red dots: it has no style, but instead of it a stigma like a bladder: the capsule is more flattened at top, the surface a little wrinkled, and as broad as long: the seeds half black. It is a native of Austria, &c., flowering in May and June.

The fourth species is a shrub about six feet high, with an ash-coloured bark, smooth, and free from tubercles: the branches are round, and a little compressed at their extremities: the leaves oblong-lanceolate, smooth on both sides, veiny on the back, and stand opposite; are very finely serrated on the edges, where they are of a purple tinge, as are also the foot-stalks: all the flowers (which are dark purple) are constantly tetrandrous. It is a native of the northern parts of Asia.

The fifth rises with a shrubby stalk to the height of eight or ten feet, dividing into many branches, which come out opposite from the joints of the stem: the leaves are lanceolate, two inches long, and about three quarters of an inch broad in the middle, ending in acute points; are opposite, and continue green all the year: the flowers are produced at the ends of the branches, and also from the sides, in small clusters; and are succeeded by round capsules, which are closely armed with rough protuberances. It flowers in July, but seldom produces ripe fruit in this climate.

There is a variety with variegated leaves.

Culture.—The four first sorts may be propagated either by seeds, layers, or cuttings of the young shoots.

In the first mode, the seeds should be sown in the clumps or borders in the early autumn, covering them well in. In the following autumn the plants should be removed and set out in nursery rows, being kept well cleared from weeds during the summer. After two or three years growth in this situation, they will be fit to plant out for good.

The young shoots may be laid down in the autumn, a slit being made at a joint placed the deepest in the ground. In the following autumn they will be well rooted, and may be taken off and planted out in the manner of the seedlings.

The cuttings should be made eight or ten inches in length, and planted in a shady border in the autumn. When they have struck full root, they should be carefully removed, and managed as those raised from seed.

The two last methods, and those of budding and grafting are the only ones by which the varieties can be continued with certainty.

The last species is best increased by laying down the young branches after being tongued in the autumn, managing them afterwards in the same manner as the others.

These plants are sufficiently hardy to bear the open air when planted in warm sheltered situations.

They are all very ornamental; the former sorts producing a fine effect by their berry-like seeds, and the last by its evergreen leaves.

EUPATORIUM, a genus comprising plants of the herbaceous flowery kind.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Compositæ Discoidææ*.

The characters are: that the calyx is common oblong, imbricate: scales linear-lanceolate, upright, unequal: the corolla compound uniform, tubular: corollets hermaphrodite, equal; proper funnel-form: border five-cleft, spreading: the stamina consist of five capillary filaments, very short: anthers cylindric, tubular: the pistillum

is a very small germ: style filiform, very long, two-cleft almost to the germs, straight: stigmas slender: there is no pericarpium: calyx unchanged: the seeds oblong: down plumose, long: (pilose, only toothletted or ciliate:) the receptacle naked.

The species cultivated are: 1. *E. altissimum*; Tall Hemp Agrimony; 2. *E. purpureum*, Purple Hemp Agrimony; 3. *E. maculatum*, Spotted Hemp Agrimony; 4. *E. perfoliatum*, Perfoliate Hemp Agrimony; 5. *E. aromaticum*, Aromatic Hemp Agrimony.

There are other species that maybe cultivated.

The first rises with a single upright green stalk, about four feet high. At each joint are four leaves in whorls; they are six inches long, and two inches broad in the middle, lessening to both ends, terminating in acute points, rough, serrate, and on short foot-stalks: the stem terminated by a close corymb of purple flowers; appearing in July, and continuing till September. It is native of North America.

The second species grows to the height of three feet or more, with a suffrutescent, upright, striated stem, but little branched: the leaves are subsessile, and of a dark green: the corymb of flowers is fastigate. Native of North America.

The third has an annual stem, about two feet and a half high, purple, with many dark spots upon it: the leaves rough, placed by threes towards the bottom of the stalk, but near the top by pairs at each joint: the flowers are purple, terminating in a sort of corymb, appearing in July and August. It is a native of North America.

The fourth species rises with annual stems, from two to three feet high, and hairy: the leaves at each joint rough, from three to four inches long, and about an inch broad at their base, gradually lessening to a very acute point, dark green, and covered with short hairs: the upper part of the stalk divides into many slender peduncles, each sustaining a close cluster of white flowers, coming out in July. It is a native of North America.

The fifth has a round stem, four feet high, strict, brachiate: the leaves are somewhat wrinkled: racemes terminating: the flowers twice the length of the calyx, snow-white, containing from eighteen to twenty-eight florets; the styles scarcely longer than the floret. In this circumstance it differs from the other species, as well as in having the calyx not imbricate. It is a native of Virginia.

Culture.—These plants may be increased by seeds in many of the sorts which produce them in this climate, and in the others by parting the roots and planting them out.

In the first mode, the seeds should be sown in

the spring or autumn, in the places where they are to remain, a moist situation being chosen for the purpose. Some prefer sowing them in beds, and afterwards transplanting them, but the former is probably the better practice.

In the latter method, the off-sets or heads should be carefully taken off and planted out early in the autumn. The last sort, being the most tender, should be covered with tan in the winter, and the same practice is useful in many of the others, especially the young seedling plants.

The plants should afterwards be kept clean, and have the stalks removed, and the earth carefully dug about them in the spring.

These plants are very ornamental in the large clumps and borders of pleasure grounds, among other flowering kinds.

EUPHORBIA, a genus containing plants of the herbaceous and shrubby succulent kind.

It belongs to the class and order *Dodecandria Trigynia*, and ranks in the natural order of *Tricocceæ*.

The characters are: that the calyx is a one-leaved perianthium, inflated, somewhat coloured, four-toothed at the mouth, (in some few five-toothed,) permanent: the corolla has four petals, (in some few five,) turbinate, gibbous, thick, truncate, unequal in situation, alternate with the teeth of the calyx, with their claws placed on the margin of the calyx, permanent: the stamina consist of several filaments, (twelve or more) filiform, jointed, inserted into the receptacle, longer than the corolla, breaking forth at different times: anthers twin, roundish: the pistillum is a roundish germ, three-sided, pedicelled: styles three, two-cleft: stigmas obtuse: the pericarpium is a roundish capsule, tricoccus, three-celled, starting open elastically: the seeds solitary, and roundish.

The species chiefly cultivated are: 1. *E. anti-quorum*, Triangular Spurge; 2. *E. Canariensis*, Canary Spurge; 3. *E. officinarum*, Official Spurge; 4. *E. caput-Medusæ*, Medusa's-head Spurge; 5. *E. tithymaloides*, Myrtle-leaved Spurge; 6. *E. heptagona*, Seven angled Spurge; 7. *E. mammellaris*, Warty-angled Spurge; 8. *E. lathyrus*, Caper Spurge.

Other species may be cultivated.

The first has a triangular, compressed, succulent stem, rising to the height of eight or ten feet, and sending out many irregular spreading twisting branches, for the most part three-cornered, but having some two, and others four angles; at their extremities are a few short roundish leaves, which soon fall off; and near these come out occasionally a few flowers, which have five thick whitish petals, with a large three-

cornered germ in the centre; the flowers soon dropping off without producing seeds. It grows naturally in the East Indies.

It has generally been taken for the true Euphorbium; but Martyn observes, that it is from the second sort that the drug now imported under that name is taken.

There is a variety with a naked three-cornered compressed stalk, sending out a great number of erect branches, which are also generally three-cornered, but sometimes four-cornered; armed with short crooked spines, having no leaves. The plants have not produced flowers here. It is also a native of India.

The second species, in its native country, grows to the height of twenty feet or more, but in this climate it is rarely seen more than six or seven: the stem is very thick, green and succulent, having four or five large angles, closely armed with black crooked spines, which come out by pairs at every indenture: it sends out from every side large succulent branches of the same form, which extend to the distance of two or three feet, then turning their ends upwards, so that the plants when well grown have some resemblance to a chandelier; they have no leaves, but are closely armed with black spines like the stem: at the ends of the branches come out the flowers, which are shaped like those of the first species. It is a native of the Canary Islands, flowering in March and the following month.

The third puts out many stalks just above the surface, which are thick, succulent and roundish, having eight or ten angles whilst they are young, but as they grow old they lose their angles and become round; the branches grow distorted and irregular, first horizontal, but afterwards turning upwards; the angles are armed with small crooked spines; and on the upper part of the branches, in June and July, come out the flowers; they are small, and of a greenish white colour. It is a native of Africa.

The fourth species has thick, roundish, succulent stalks, which are scaly; they send out many branches from their sides of the same form, which are twisted, and run one over another, so as to appear like a parcel of serpents, whence it has the appellation of Medusa's head: at the end of these are narrow, thick, succulent leaves, which drop off; and round the upper part of them the flowers come out; these are white, and of the same form with those of the other sorts, but larger; and frequently succeeded by fruit.

There is a variety termed *Little Medusa's Head*, which has a thick short stalk, seldom more than eight or ten inches high, from which come out a great number of slender trailing branches, about a foot in length, intermixing and having

the same appearance with the other, but smaller and much shorter: the ends beset with narrow leaves, between which the white flowers come out and appear. It is a native of Africa.

Some also have a dwarf-trailing and double-branched as well as other varieties.

The fifth species is a wandlike suberect plant, six feet high, the whole of it abounding in a white bitterish milky juice: the stems numerous, round, smooth, weak, very pliant, branched, the thickness of a finger or the thumb, the older ones ash-coloured, the younger green: the leaves some obtuse, others acute, coriaceous, quite entire, petioled, deep green, two or three inches long, deciduous except on the branches, the middle dorsal nerve and the petiole augmented by a longitudinal lamella more or less waved and conspicuous, at first frequently tomentose on both sides, but with the upper surface very even, and the edges extremely waved; afterwards both sides always become flat and smooth: the peduncles one-flowered, short, aggregate about the extremities of the branchlets, coming out principally when the plant is without leaves: the flowers are void of scent, of a beautiful scarlet colour. It is a native of the Caribbee Islands.

There are varieties with laurel leaves and variegated leaves.

The sixth has a roundish, upright, succulent stem, about three feet high, putting out several branches on the side, of the same form; the angles are armed with long, single, black spines: at the ends of the branches come out small flowers, which are sometimes succeeded by small fruit. It is a native of the Cape.

The seventh has also roundish stems, swelling out in the middle, and having knobbed angles, between which come out long straight spines; these stems are two feet high, and put a few branches from their side of the same form, at the ends of which flowers are produced, sitting close upon the angles, they are small and of a yellowish green colour. It differs from the preceding in having the angles doubled and swelling a little; and the spines single between the tubercles, which are placed longitudinally. It is a native of the Cape, flowering in July and August.

The eighth species has an upright, succulent stem, from three to four feet high, with oblong

smooth sessile leaves; the upper part dichotomous, and an umbel comes out from each division; that in the first being the largest, and those in the upper the smallest. The flowers are of a greenish yellow colour, appearing in June and July, and are soon after succeeded by fruit. It is a native of France, &c.

Culture.—All these plants may be raised by setting cuttings made at a joint five or six inches long, after being rubbed in sand, and laid on a shelf a few days to have the wounds healed over, in the summer, about June, in small pots filled with light, dry, sandy mould, with some rubbish at the bottoms, such as that constituted of a fourth part of screened lime rubbish, the same proportion of sea-sand, and one half of light fresh vegetable earth, well mixed and blended together by frequent turning over, plunging them in the bark hot-bed, giving due shade in hot sunny weather, and a little water once or twice a week, as there may be occasion. When the plants have stricken root they should have air admitted pretty freely in that situation, or be removed into the stove to be hardened before winter.

They must afterwards be allowed larger pots once a year as they advance in growth, and be frequently refreshed with water in the summer season, but only very sparingly in the winter.

Most of these sorts are capable of being kept on the shelves of hot-houses, and some of them, as the fifth, sixth, and seventh, in a dry airy green-house, or glass-case, during the winter season, care being taken to guard them against the frost, and in the summer they may be set out in the open air.

The fourth species stands in need of support to prevent the weight of the branches forcing it upon the pots; and by such management they will rise four or five feet in height, producing numerous side-branches.

The eighth sort requires little or no care when once introduced, except keeping the young plants clean, as it will be continued by its scattering the seeds.

The whole of these sorts, except the last, afford variety in hot- and green-house collections, and that in the borders of the pleasure-ground.

FAGARA, a genus containing plants of the exotic kind for the stove.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Dumosae*.

The characters are: that the calyx is a four-cleft perianthium, very small: leaflets concave, permanent: the corolla has four oblongish petals, concave, spreading: the stamina consist of four filaments (three to eight), longer than the corolla: anthers ovate: the pistillum is an ovate germ: style filiform, length of the corolla: stigma two-lobed, obtusish (four-cleft): the pericarpium is a globular capsule, one-celled (or two-celled), two-valved: the seed single, round, and bright.

The species are: 1. *F. Pterota*, Lentiscus-leaved Fagara, or Bastard Ironwood; 2. *F. Tragodes*, Prickly-leaved Fagara.

The first is a shrub with wrinkled branches, which, according to Browne, rises by a branched and somewhat prickly stalk frequently to the height of eight or ten feet; the wood very hard: the leaves alternate, pinnate, with three pairs of leaflets; and the common petiole margined and jointed. The leaflets obovate, quite entire, emarginate, smooth. The spikes axillary, sessile, in pairs. The flower small and white. It is a native of Jamaica.

The second species is a shrub, branching, almost erect, five feet in height. The prickles in pairs, subulate, recurved, strong, subaxillary, brown, shining; there is one similar, but smaller, on the back of each joint of the leaves; these are alternate, sessile, pinnate jointed: leaflets oblong, attenuated at the base, obtuse quite entire, shining, sessile: joints usually six, in every respect similar to the leaflets. The flowers are small, axillary, and aggregate. It is a native of St. Domingo, flowering in February.

Culture.—These plants may be increased by sowing the seeds in pots in the early spring, and plunging them in the bark-bed of the stove. When the plants have attained some growth they should be removed into other pots, and be replaced in the hot-bed.

They may likewise be raised by planting cuttings of the young shoots in pots, and plunging them in the bark-bed in the stove, due shade and water being given till they have stricken root. They should afterwards be removed into separate pots, and be replaced in the stove hot-bed.

These are tender plants, requiring the constant protection of the stove, where they afford variety.

FAGUS, a genus containing plants of the tree kind.

It belongs to the class and order *Monoecia Polyandria*, and ranks in the natural order of *Amentaceae*.

The characters are: that the male flowers are fixed to a common amentaceous receptacle: the calyx is a one-leafed perianthium, bell shaped, five-cleft (four-, five-, or six-cleft,) (subsexfid): there is no corolla: the stamina consist of many filaments, the length of the calyx, setaceous: anthers oblong: the female flowers in a bud of the same plant: the calyx is a one-leafed, four-toothed, erect, acute perianthium: there is no corolla: the pistillum is a covered germ with the calyx: styles three, subulate (one-trifid): stigmas simple, reflex: the pericarpium is a capsule (which was the calyx) roundish, very large, covered with soft spines, one-celled, two- to four-valved: the seeds are nuts, one or two, ovate, three-cornered, three-valved, acuminate.

The species cultivated are: 1. *F. sylvatica*, The Common Beech-tree; 2. *F. castanea*, Common Chesnut-tree; 3. *F. pumila*, Dwarf Chesnut-tree, or Chinqua-pine.

The first grows to a very large size, lofty and spreading; the trunk straight, and covered with a whitish bark. The leaves are smooth and glossy, waved on the edges rather than serrate, or slightly sinuate-toothed, three inches and more in length, and two or upwards in breadth: the petioles reddish, slightly grooved above, four or five lines in length, pubescent, as is also the midrib of the leaf. The stipules reddish-brown, shining, lanceolate, conspicuous. It retains the old leaves through the winter. The male catkins come out in bunches from the ends of the small branches; are roundish, obtuse, half an inch long, and almost as broad; on peduncles from half an inch to fourteen lines in length, pendulous, round, and pubescent. The female aments come out from the same place, a little above the others; are erect, and on round, whitish, villose peduncles: the common involucre has two flowers, is four-cleft, and covered with soft spines. The fruit is composed of two nuts joined at the base, covered with an almost globular four-valved involucre, with soft spines on the outside, but within very smooth and silky: the nuts, when ripe, are one-celled

and triangular, containing one or two angular seeds. It is a native of the greater part of Europe, &c.

Martyn remarks that some suppose there are two species of this tree, the *Mountain Beech* and the *Wild Beech*; "the first of which has a whiter wood than the second; but that this difference arises only from the soil."

In the nurseries there are two varieties, one with yellow, and the other with white-striped leaves. And in Germany there is another variety with dark red leaves, which is called the *Purple Beech*. In woods there is likewise a sort with a rougher bark, which is termed *Hay Beech* by woodmen.

The second species grows to a very great size, and spreads its branches finely on every side where it has room; but, planted closely, shoots up straight to a great height. The leaves are large, of a lucid green colour, ending in a long very taper point, and the serratures terminate in a kind of tender prickles; the leaves are about four or five inches long, and two wide, somewhat wrinkled, having several transverse veins, prominent on the under surface, and proceeding from a strong midrib. The aments or catkins of the male flowers are pendulous at the ends of the branches, very long, and resemble those of the walnut. They have a strong spermatie smell; the flowers are collected in remote little balls, and are sessile. The proportion of male flowers to the females is prodigious. The stamens are about nine in number (five to eighteen). In the female flowers the number of styles varies from four to seven, but six is the most common. The calyx becomes an echinate capsule of four valves, of a silky smoothness on the inside, containing two nuts, sometimes three, or only one. It is naturalized to most parts of Europe.

There is a variety cultivated with gold-striped leaves.

The third seldom grows above twelve or fourteen feet high, but produces great plenty of nuts, which are, for the most part, single in each capsule. It is very hardy, and will resist the severest of our winters in the open ground, but is very apt to decay in summer, especially in a dry soil. And, though it delights in moisture, yet, if the wet continues long upon the ground in winter, it frequently destroys it. It is very common in the woods of America.

Culture.—These trees may be increased without much difficulty.

Culture in the Beech kind.—These are raised by sowing the well-ripened seed or mast, on beds of fine mould prepared for the purpose, either in the early autumn or spring season, in slight drills or broadcast, covering them well in

by raking. When the plants come up they should be kept perfectly clear from weeds, and after two years growth be planted out in nursery rows, two feet or two feet and a half apart, and from a foot to eighteen or twenty inches distant in the rows; in which situation they should be kept properly cleared from weeds, and have the intervals of the ground well dug over annually, in the autumn or very early spring. Some advise cutting the roots under with a sharp spade at the depth of four or five inches once or twice while in the seed-bed. When they have attained the growth of four or five feet in height, they are proper for being planted out in plantations, shrubberies, and other places, where they are to grow for ornament or timber. The varieties with striped leaves are to be continued by budding or grafting on common beech stocks, taking care not to plant them where the soil is of the rich kind.

Culture in the Chestnut kind.—These trees may be increased by sowing or planting the nuts, which have been well ripened here, or such as have been brought from abroad, without being dried in kilns, in the early spring, on beds of fresh earth in drills two or three inches deep, and about a foot asunder, placing them three or four inches distant, and covering them well in. When the plants appear, they should be kept clear from weeds, and, after they have had two years growth in these beds, they should be removed into nursery rows in the beginning of autumn, being planted two feet and an half from row to row, and from one to two feet distant in the rows, great care being taken not to injure their roots in taking them up, unless they happen to have tap roots, which must be cut off.

After they have remained in this nursery four or five years, and been kept perfectly free from weeds, by hoeing or slightly digging over the intervals between the rows, they will be in a proper state for being finally planted out as ornamental fruit- or forest-trees. When they are intended to be planted for the fruit, they should be more frequently transplanted before they are finally set where they are to grow; but they are not of much importance in this view, as the fruit does not always ripen well in this climate.

The varieties with variegated or blotched leaves must be continued by budding or inarching them on stocks of the common kind.

The third sort may be raised in the same manner from nuts brought in sand from America, and have the same method of culture afterwards.

The first sort is frequently made use of as timber-trees and in forming hedges, and the

others as ornamental trees in lawns, clumps, borders, and other parts of pleasure-grounds, where they have a fine effect. They succeed on almost any soil, but the best on those of the loamy kind.

FAIR-MAIDS-OF-KENT. See *RANUNCULUS*.

FAN PALM. See *CHAMÆROPS*.

FEATHER PRINCE'S. See *AMARANTHUS*.

FEATHERED COLUMBINE. See *THALICTRUM*.

FENNEL. See *ANETHUM*.

FENNEL FLOWER. See *NIGELLA*.

FENNEL GIANT. See *FERULA*.

FERRARIA, a genus containing a plant of the herbaceous flowery green-house kind.

It belongs to the class and order *Gynandria Trigynia*, and ranks in the natural order of *Ensatæ*.

The characters are: that the calyx has two spathes, alternate, keeled, involute; each one-flowered: the corolla has six petals, oblong, acuminate, revolute, curled, and fringed; alternately smaller: the stamina consist of three filaments, sitting on the style: anthers roundish, twin, rough-hairy: the pistillum is an inferior germ, roundish, three-cornered, obtuse: style simple, erect: stigmas three, bifid, cowl-ed, fringed and curled: the pericarpium is an oblong capsule, three-cornered, thicker at top, three-celled, three-valved: the seeds numerous and roundish.

The species cultivated is *F. undulata*, Cape Ferrara.

It has a tuberose, roundish, compressed root, in shape like that of the Indian corn-flag, but larger; in the centre of the upper side it has a hollow like a navel, whence comes out the stalk; the outerskin is of a light brown colour, the inside white. It lies inactive every other year, and sometimes will remain two years without putting out either leaves or fibres. The stem is a foot and half high, taper, and about the thickness of a man's little finger. It has lanceolate leaves the whole length, placed alternately, and embracing: the lower leaves are from four to five inches long, and an inch and half broad towards their base, ending in obtuse points; a little keel-shaped, and of a light-green colour. The flowers are axillary, solitary, from the upper part of the stem, wrapped in a double sheath, out of which the flower-bud rises about an inch. The sheath is composed of a double row of keel-shaped leaves; the inner row being shorter than the outer, and situated obliquely to it. It is a most singular and beautiful vegetable production, flowering from February to May, and a native of the Cape.

Culture.—This plant is increased by planting the offsets from the roots, in borders prepared for the purpose, in the fronts of the green-house or stove, and covered by frames and glasses in the early spring months. When the plants come up, they require a pretty free air during mild weather, but to be well protected from frost. In very hot weather occasional slight waterings are also necessary.

It is an ornamental plant for green-house collections.

FERULA, a genus comprehending plants of the herbaceous perennial flowery kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Umbellatæ*.

The characters are: that the calyx is an universal umbel, manifold, globular; partial similar: involucre universal caducous; partial many-leaved, linear, small: proper perianthium, scarcely observable: the corolla universal, uniform: floscules all fertile; proper consisting of five oblong, straightish petals, nearly equal in size: the stamina have five filaments, the length of the corolla: anthers simple: the pistillum is a turbinate, inferior germ: styles two, reflex: stigmas obtuse: the pericarpium an oval fruit, plane-compressed, submargined, marked on both sides with three raised lines, and bipartite: the seeds two, very large, elliptic, flat on both sides, and marked with three distinct streaks.

The species are: 1. *F. communis*, Common Fennel-Giant; 2. *F. glauca*, Glaucous Fennel-Giant; 3. *F. Tingitana*, Tangier Fennel-Giant; 4. *F. Ferulago*, Broad-leaved Fennel-Giant.

The first, in good soils, grows to a great height, and divides into many branches. The lower leaves spread more than two feet every way, and branch out into many divisions, which are again subdivided into many smaller; they are of a lucid green, and spread near the ground. From the centre of the plant comes out the flower-stem, which, when the plants are strong, is nearly as large as a common broom-stick, and ten or twelve feet high, with many joints; there issues from it, when cut, a fetid yellowish liquor, which concretes on the surface of the wound. It is terminated by large umbels of yellow flowers, which appear about the end of June, or the beginning of the following month, and the seeds ripen in September. The roots continue several years, especially in a dry soil, and annually produce flowers and seeds. It is a native of Italy, &c.

In the second species the leaves are composed of many narrow flat segments, of a gray colour, and are divided into many parts. The stem is from three to four feet high, terminated

by an umbel of yellow flowers, appearing in July, and succeeded by oval compressed seeds, which ripen in autumn. It is a native of Spain, &c.

In the third the leaves are large, spreading near the root, of a very lucid green, divided and subdivided into many parts; leaflets much broader than in the other sorts, and divided at the end into three unequal segments. The stems are strong, eight or ten feet high, terminated by large umbels of yellow flowers. It is a native of Spain and Barbary.

The fourth species rises to the height of seven or eight feet. The leaves branch out on every side pretty wide, and the leaflets are broader than those of the other sorts, except the preceding; but they are longer than those, and of a darker green colour, ending in three points. The umbels are large, and the flowers of a yellow colour. It is a native of Sicily.

Culture.—These plants are all capable of being increased by sowing the seeds in the autumn or spring season, on beds of light earth, in small drills, a foot apart, and three inches distant in them. When the plants have attained some growth, they must be well weeded, and properly thinned out. In these beds they may remain for two years, when they should be carefully taken up in the beginning of the autumn, and planted out where they are to grow. They succeed best in such loamy soils as are of a mellow and rather moist quality.

They are hardy, and proper for being planted for the purpose of ornament in the large clumps, borders, and other parts of pleasure-grounds, where they will continue several years.

FICUS, a genus containing a tree of the deciduous fruit kind.

It belongs to the class and order *Polygamia Trioecia*, and ranks in the natural order of *Sca-bridæ*.

The characters are: that the calyx is common obovate, very large, fleshy, concave; closed with very many semilanceolate, sharp, serrate, inflex scales. The inner surface is covered with floscules, the outer of which, or those which are nearer to the edge of the calyx, are male; these are fewer in number; the rest, lower down, are female, and more numerous: male, each on its proper peduncle: the calyx is a proper perianthium, three-parted, erect (bell-shaped, trifold): divisions lanceolate, erect, equal: there is no corolla: the stamina consist of three filaments, bristle-shaped, length of the calyx: anthers twin: the pistillum has rudiments caducous, intorted: female, each on its proper peduncle: the calyx is a proper perianthium, five-parted (bell-shaped, quinquefid): divisions lan-

ceolate-acuminate, straight, nearly equal: there is no corolla: the pistillum is a germ (half inferior), oval, the size of the proper perianthium: style subulate (bristle-shaped,) inflex, coming out from the germ at the side of the tip: stigmas two, acuminate, reflex; one shorter than the other: there is no pericarpium: the calyx oblique, containing in its bosom a seed, larger: the seed single, roundish, and compressed.

The species are: 1. *F. carica*, Common Fig-tree; 2. *F. sycomorus*, Egyptian Fig-tree, or Sycomore; 3. *F. religiosa*, Poplar-leaved Fig-tree; 4. *F. Bengalensis*, Bengal Fig-tree; 5. *F. Indica*, Indian Fig-tree.

The first is a tree which seldom exceeds two yards in height: the trunk is about the thickness of the human arm; the wood porous and spongy: the bark ash-coloured, full of chinks, and rugged: the branches smooth, with oblong white dots, erect or ascending, fluxuose, and bent back: the stipules in pairs, sessile, ovate, acute, ferruginous, caducous: the leaves annual (in Europe, but within the tropics perennial), cordate, ovate, three- or five-lobed, with rounded sinuses, serrate-toothed, paler underneath, rugged on both sides, spreading, the size of the hand, or a span in length: the petioles are round, grooved, about an inch in length: fruits axillary, solitary, the size of a pear, on very short round peduncles: the flowers produced within the fruit. It is a native of Asia.

There are several varieties, the chief of which are the following:

The *Brown Ischia Fig*, which has a large fruit, short, globular, with a pretty large eye, pinched in near the foot-stalk, of a brown or chestnut colour on the outside, and purple within: the grains large, and the pulp sweet and high-flavoured; it often bursts open as it ripens, in the end of July, or the beginning of August. This fruit ripens well on standards in warm soils.

The *Black Genoa Fig*, which has a long fruit, that swells pretty large at the top, where it is obtuse, the lower part very slender towards the stalk; the skin of a dark purple colour, almost black, and has a purple farina over it like that on some plums; the inside is of a bright red, and the flesh very high flavoured. It ripens early in August.

The *Small White Early Fig*, which has a roundish fruit a little flattened at the crown, with a very short foot-stalk; the skin thin, and when fully ripe of a pale yellowish white colour; the inside white, and the flesh sweet, but not high-flavoured. It ripens in August.

The *Large White Genoa Fig*, which has a large globular fruit, a little lengthened towards the

stalk; the skin thin, of a yellowish colour when fully ripe, and red within. It is a good fruit, but the trees are not good bearers.

The *Black Ischia Fig*, which is a short fruit, of a middling size, a little flattened at the crown; the skin almost black when ripe, and the inside of a deep red; the flesh very high-flavoured. It bears well, and ripens in August.

The *Malta Fig*, which is a small brown fruit, much compressed at the top, and greatly pinched towards the foot-stalk; the skin and inside are of a pale brown colour; the flesh very sweet, and well flavoured. When the fruit is permitted to hang upon the trees till shrivelled, it becomes a fine sweetmeat.

The *Murray*, or *Brown Naples Fig*, which has a pretty large globular fruit, of a light brown colour on the outside, with faint marks of a dirty white, the inside nearly of the same colour; the grains are pretty large, and the flesh well flavoured. It ripens the latter end of August.

The *Green Ischia Fig*, which has an oblong fruit, almost globular at the crown; the skin is thin, of a green colour; but when fully ripe, stained through by the pulp to a brownish cast; the inside purple, the flesh high flavoured. It ripens about the end of August.

The *Madonna*, *Brunswick*, or *Hanover Fig*, which has a long pyramidal fruit of a large size; the skin brown; the flesh of a light brown colour, coarse, with little flavour. It ripens the end of August and the beginning of September.

The *Common Blue*, or *Purple Fig*, which is oblong; it is a great bearer. The fruit ripens in August.

The *Long Brown Naples Fig*, which has the leaves deeply divided; the fruit long, somewhat compressed at the crown; the foot-stalks pretty long; the skin of a dark brown when fully ripe; the flesh inclining to red; the grains large, and the flesh well flavoured. It ripens in September.

The *Yellow Ischia Fig*, which has a large fruit, of a pyramidal form; the skin is yellow when ripe, and the flesh purple and well flavoured. It is not a good bearer, but ripens in September.

The *Small Brown Ischia Fig*, which has a small pyramidal fruit, with a very short foot-stalk; the skin of a light brown, the flesh inclining to purple, of a very high flavour. It ripens late in September. It is not a good bearer.

The *Gentile Fig*, which has a middle-sized globular fruit; the skin when ripe, yellow; the flesh also inclines to the same colour; the grains large, and the flesh well flavoured, but it ripens very late, and is a bad bearer.

There are also others, as the Best Early White,

Black Provence, Cyprian, Ford's Seedling, Green Naples, Large Black, Large Blue, Marseilles, Milward, Small Black Ischia, White Ischia, Yellow Caesar.

Those most proper for a small garden, according to Mr. Forsyth, are: the Large White Genoa; Early White; Murray; Small Brown Ischia; and the Black Ischia.

In a good season, he observes, the Brown or Chesnut-coloured Ischia; the Black Genoa; the Small White Early; the Murray, or Brown Naples; and the Common Blue, or Purple Fig, will ripen on standards.

The second species is a large tree, with leaves like those of the Mulberry; the fruit produced from the trunk and large branches, having the shape of the Common Fig, with a slight aromatic sweet taste.

It is here called the Sycomore-tree, and Mulberry Fig-tree. This, and not the Great Maple, is the right Sycomore. It is native of Egypt.

The third, in its native situation, is a large tree, with a short trunk, and very long spreading boughs: the leaves smooth, of a light green, six or seven inches long, and three inches and a half broad towards the base, diminishing gradually to the top, where they run out into a narrow point, an inch and half long; the fruit comes out on the branches, is small, and of no value. It is a native of the East Indies.

The fourth species has a shrubby stem, round, upright, all smooth, a fathom in height: the branches like the stem: the leaves somewhat waved, nerved, the size of the hand, on a semicylindric petiole half an inch in length. It is a native of the East Indies.

The fifth, in its native climate, is a vast tree, entirely smooth, the branches spreading very wide, bowed down, the lower ones rooting, ash-coloured: the leaves acuminate, with a blunt point, obscurely waved, marked with parallel nerves, paler underneath, a span long, on semicylindric ash-coloured petioles of a finger's length: fruits aggregate here and there on the branchlets, peduncled, the size of a hazel nut.

It is known by the name of Banyan-tree. It is a native of the East Indies.

Culture.—The first sort and varieties may be readily increased, either by suckers, layers, or cuttings; but the two last are the best methods, according to Mr. Forsyth.

The suckers should be taken off from the roots as low down as possible, and, after being trimmed, planted out in nursery rows at the distance of two or three feet from each other, with the top entire, to take its natural growth, when intended for standards; but, when for walls, espaliers or dwarfs, in the situations where they

are to remain. In the latter case, they should be cut or headed down to six or eight inches in the early spring, to induce lateral shoots to be thrown out near the ground.

The layers should be made from the well ripened woody shoots of the bearing trees, and be laid down in the autumn, or early in the spring, being protected from frost during the winter by tan or some sort of strawy material. When the plants are sufficiently rooted, as in the following autumn, they should be taken off and planted out in the places where they are to remain, as they do not bear transplanting well, being covered at the roots with dung, tan, or litter during the winter season.

The cuttings of the well ripened woody shoots of the former year, without being shortened, may be planted in the beginning of the autumn in beds of loamy earth in a warm sheltered situation, to the depth of eight or ten inches, protecting them well during the winter with tanner's bark and straw, or some other similar material, the latter being removed as the spring advances. When they have stricken good root in the following autumn, they should be taken up and planted where they are to grow.

These trees are mostly cultivated as standards in warm climates, but in this in general against walls or as espaliers; and only sometimes as standards.

The sorts usually cultivated against walls, are those of the blue and white kinds, but several of the others succeed well in this management.

But for espaliers and as standards, the first, second, third, ninth, and tenth varieties are probably the most proper.

In their culture as wall-trees, they should always be placed in sunny situations for the purpose of the fruit being the most effectually ripened, as in that of a full southern exposure, but an east or west aspect will answer very well when that cannot be had.

In planting them out, where the walls are of considerable height, fifteen or eighteen feet distant may be sufficient; but in low walls twenty or more is not too much space. Mr. Forsyth advises from twenty to twenty-four feet as the most suitable distance for planting these trees.

Where the trees are planted against fire-walls, they should not be kept too close, be drawn by glasses, or have the heat too great, but have at all times, when the weather is favourable, a good share of free air admitted; and if the trees are young, care should be taken that their roots are not extended beyond the reach of the covering; they must be frequently watered when they begin to show fruit, otherwise it will drop off; but old

trees, whose roots are extended to a great distance, only require to have their branches now and then sprinkled over with water. Where these trees are properly managed, the first crop of fruit is greater than upon those which are exposed to the open air, and ripens six weeks or two months earlier, and a plentiful second crop may also be obtained, which ripens early in September, and sometimes in August; but the fires should not be used to these trees till the beginning of February; as, when they are forced too early, the weather is frequently too cold to admit a sufficient quantity of fresh air to set the fruit; but the covers should be put over the trees a month before, to prevent the shoots from being injured by the frost.

The management of the trees in the common method, after they have been headed down or shortened in the manner mentioned above, whether they be on walls or espaliers, is that of training them horizontally, so as to preserve the branches in an equal and regular manner on each side, at the distance of from six to eight inches from each other, and for the most part keeping their full length without any shortening, that as large a proportion of young or bearing wood as possible may be preserved. Some, however, advise their not being laid in so close, considering a foot or eighteen inches as little enough room.

In the pruning of these trees, Mr. Forsyth advises, that it should never be done in the autumn or winter, but in the early spring months. The best time he conceives to be about the latter end of April or beginning of the following month, as by this period it may be ascertained what branches have been destroyed by the severity of the winter. And as the ends of those branches, the wood of which has not ripened well in the autumn, will be most injured, they should be cut into the sound wood, as near to an eye or bud as possible.

In cases where the branches have been permitted to run up so as to leave the bottom in a naked state, every other branch is advised to be cut out as near to the ground as it can be done, by which the walls or espaliers will be provided with good young wood; care being taken to stop the ends of the shoots in summer, as about the beginning of June, in order to induce side-shoots to be thrown out for fruiting the following summer; by which time plenty of fine wood will be provided, and then the remainder of the old branches may be cut out as before, pruning their young shoots as in the preceding case, constantly pinching off the ends of all the strongest shoots at the top bud, except such as are leading ones.

In the spring prunings, as the fruit is produced near the tops, the bearing shoots should

never be shortened, nor should the fine short side and fore right shoots be cut off, except when decayed; as they ripen better than the long strong ones, and are not so apt to be destroyed by frosts in the winter season. By this practice, it is contended that the trees will be covered with fruit from the tops to the bottoms of the wall, &c. instead of having a few only at the top, as is the case in the common method of management.

In summer, as many shoots are sent off, some of those that are irregular and useless may be rubbed off, and the others trained in for the forming of future bearing wood. The proper period for this is about the beginning of June and in the two following months.

After the fruit has attained the size of small nutmegs, the points of the top buds are recommended by Mr. Forsyth to be pinched or cut off with a sharp knife, some of his powdery material being immediately applied, to prevent the oozing out of the milky juice, and the consequent exhaustion and injury of the trees.

In order to prevent the necessity of cutting the trees down in the above manner, they should be covered in winter before the approach of frost, which would destroy the ends of the shoots before the wood was ripened and rendered hard.

Where Fig-trees are greatly injured in the winter, the best practice is to cut them down as near the ground as possible, as in the following year, by the above management, they may be got into a good bearing state.

The best mode of protecting these trees is, according to Mr. Forsyth, to "cover them with bentings, or short grass, from the pleasure-ground, which he finds answers the purpose very well; after it is thoroughly dry, it may be put in a cock, covering it with straw, to prevent the rain from penetrating into it, which would cause it to heat and rot;" or it may be put into a shed. If grass cannot be procured, some dry moss may be employed. In performing the work, "first cover the trees with laurel, yew, fir, or spruce boughs, and then tuck in the short grass or moss among the branches, beginning at the top of the tree, tucking in the grass, &c. as you descend, till you come to the bottom." Fern, when well dried, he says, makes an excellent covering. The trees may be thatched on the outside with the long leaves of the common fern; and where these can be got, there will be no occasion for short grass. When it can be procured, which it may in most country places, it will, he says, be found preferable to laurel.

They "may also be sheltered in winter by wrapping hay or straw bands round the branches of the trees; and then opening the ground, laying

in the branches, and covering them over with mould about nine inches deep, leaving the ends of the shoots about three inches out of the ground, and covering the ground over with some rotten leaves, or old tan, &c. to keep out the frost." The roots of the trees may likewise be covered in the same manner. Where the walls are low, and the borders broad, all the branches may be brought front ways; but when they are high, only the side branches can be brought forward in the above manner. It is the practice of some to cover with reeds and straw; the latter he does not by any means approve of, "as it is very apt to harbour rats and mice, on account of some of the grain being left in it."

In putting on the grass, care should be taken that no mice, &c. have got amongst it; and during the winter, it should be seen that no rats or mice get among the branches of the trees that are covered against the walls; as if they do, they will infallibly bark the branches, and in that case there will be a necessity of heading the trees down.

These may be destroyed by setting traps near the roots of the trees, as soon as they are covered. See TRAPS.

Great care, he says, should be taken, "not to uncover the Fig-trees too soon in the spring; and it should be done partially, as there are frequently frosts and cutting winds in the months of April and May, which will infallibly kill the young fruit as they make their appearance in the spring."

"Those branches which have been laid into the ground should be taken up in the month of April, having the hay or straw bands taken off, and then nailed to the wall. Some fern-leaves, or any other light covering, may be stuck in among the branches, to protect them from the drying winds and frosts, till the fruit comes to the size of a large walnut, or rather till the leaves are sufficiently large to protect the fruit."

It is observed, that "the Italians, when they wish to forward the ripening of Figs, drop in a little sweet oil, from a quill, into the eye of the fruit; but care must be taken not to hurt the skin, which will make the Fig burst. This will make a difference at least of a fortnight in the ripening."

It is also recommended, "as soon as the leaves begin to fall, to brush them off with a broom, but by no means till they will come off easily. If they are forced off before they begin to wither and decay, the trees will bleed at the foot-stalks. At the same time the stalks should be cleared of all the small late fruit, which, if suffered to remain during the winter, will rot, and

injure the tree so as to prevent it from bearing the ensuing summer. If any milk be observed oozing from the foot-stalks, a little of the composition should be used, which will stop it, and heal the injured part. See COMPOSITION.

By doing this, the ripening and hardening of the wood will be assisted before the winter frosts set in.

In standard-trees of all sorts, little pruning is necessary, only just to take out the very irregular branches and the young shoots when too much crowded, and the dead ends of the shoots, as well as any dead wood that there may be in them.

Mr. Forsyth, however, observes that, "as the branches of standard Fig-trees are very liable to be killed in severe winters, it will be necessary to lay them also in the ground, wrapping them up in hay or straw bands, as directed for wall-trees. It will be sometimes impracticable to lay down the middle branches; they must, therefore, be well covered with hay or straw bands, and the outside ones laid down, going regularly round the tree, and taking particular care not to hurt them with the spade, then to mulch them with rotten leaves, &c."

Where Mr. Forsyth has been under the necessity of cutting Fig-trees down near to the ground after hard winters, he has found, by the use of his composition, that "in the course of two years, the new wood has covered over the old stump, and the branches filled up the former space, bearing also plenty of fine fruit."

The other species are easily propagated by cuttings during the summer season. When the cuttings are taken from the plants, they should be laid in a dry shady place for two or three days, that the wounds may be healed over, otherwise they are apt to rot; after which they should be planted in pots filled with sandy light earth, and plunged into a moderate hot-bed, where they should be shaded from the sun, and two or three times a week gently refreshed with water, if the season is warm; but they must not have too much moisture, as it would infallibly destroy them. When the cuttings have taken root sufficiently, they should be each planted into a separate small pot filled with light undunged earth, and replunged into the hot-bed, shading them until they have taken fresh root; then they should have a large share of free air admitted to them at all times when the weather is favourable, to prevent their drawing up weak, and to give them strength before the cold comes on. In autumn the pots should be removed into the stove, and be plunged into the tan-bed, where they should constantly remain, and be treated in the same manner as other tender plants from the same

countries; for although two or three of the sorts may be treated in a hardier manner, yet they will not make much progress. They may likewise be increased by layers.

They are shrubs in this climate which afford variety in stove collections.

FINOCHIO. See ANETHUM.

FIR-TREE. See PINUS.

FLAG COMMON. See IRIS.

FLAG SWEET. See ACORUS.

FLOS ADONIS. See ADONIS.

FORCING, the art of raising and producing plants, flowers, and fruits by means of artificial heat. It is accomplished, either by the gentle moist heat that is evolved during the fermentation and decomposition of stable-dung, tanner's bark, and other similar materials, or by the use of actual fire in stoves, flues, and other contrivances for the purpose.

The former of these methods is principally employed in raising Cucumbers, Melons, and some other fruits, and the latter in producing Pine Apples, various kinds of wall-fruits, and several other sorts of vegetable productions.

The great difficulty in the management of this process, is that of adapting and regulating the heat, of whatever sort it may be, in such a manner as to promote and bring forward the plants in the most perfect and healthy growth, without their sustaining injury either by a deficiency or excess. The various methods of effecting this in the most perfect manner are fully described under the culture of the different trees, plants, and vegetables that require such treatment in their cultivation.

It is by this process that different sorts of vegetable productions, fruits and flowers are afforded at much earlier periods than could otherwise be the case, and it of course constitutes an important branch of practical gardening.

FORCING-FRAME, that kind of large framework or erection which is made use of in procuring different sorts of vegetables, fruits, and flowers at an early period, by the application of artificial heat in some of the above modes. It is a sort of construction covered with sloping glass sliding frames on the top, and sometimes in the front. It may be either fixed or moveable, but in the former case the walls are mostly made of brick work.

These sorts of forcing-frames are usually placed full to the south sun, and the length may be from ten to fifty or one hundred feet; the width from five to fifteen, and from five to ten high; having an upright back wall, of wood, where small, but when large, of brick; and a front of glass-work, made sometimes in one continued range of slope to the top of the back wall; and sometimes with

upright glass-work, head high, ranging immediately along the front, and from the top of which a glass roof is carried to the top of the back or main wall: when wrought by dung-heat, it is chiefly applied against the outside of the back wall, and by being formed into a bed internally: when by bark-heat, by forming it into a bed in a pit within-side; and when by fire-heat, by having several returns of flues against the inside of the back wall, and that of the front and both ends, for the heat to pass along, constructed according to the sorts of plants chiefly intended to be forced, and the nature of the materials to be employed in producing the heat.

Where the first kind of material is employed in affording heat, the frame is usually formed with an upright back and ends of deal planking, and a sloping front of moveable glass-lights; the length may be ten, twenty, or thirty feet, or more; the width, from three to five (or more), and five or six high; the frame-work should be of inch-and-half deal planking, tongued, and closely joined, that no steam from the dung may penetrate into the frame; raised five, six, or seven feet high behind, and only ten or twelve inches high in front, raising both ends answerable to the front and back; the glass-work to range, from the upright in front, sloping upward towards the back wall, to about a foot width at top, there resting the ends upon proper frame-work of wood; and bars or bearers, three inches in width, ranged sloping from the back to front, for the support of the lights, as in common hot-bed frames, and the top of all boarded wind and water tight; having sometimes within-side two or three ranges of narrow shelves along the back and ends, for pots of small plants, and the bottom levelled, on which to place pots of larger kinds; or shelves may be made rising one behind another quite from the front half way up the back wall, in order to place the lowest plants in front, the others in order behind them, rising gradually to the tallest in the back rows.

In working these frames; after having placed the pots of plants in regular order, the lights are put on, and a sufficient quantity of fresh hot stable-dung, prepared as for common dung hot-beds, is to be piled up close against the outside of the back and ends, a yard wide at bottom, drawing it gradually into a foot width at top, finishing it somewhat sloping, to throw off wet; and as the dung settles or sinks down, a fresh supply must be added at top, to maintain the lining to the full height of the frame, additions being occasionally made of fresh dung as the heat declines; by this means a fine growing heat will be thrown in. See HOT-BED.

Where bark is made use of in producing

heat, the frame may be constructed either of wood or brick-work, and fronted, &c. with sashes of glass as the former; the length may be ten, twenty, or thirty feet, or more; eight or ten wide, and six or eight high; and, like the dung-heat frame, be six or eight feet high behind, and one in front, the ends conformable and sloping, having glass-work frames raised from the front, sloping either quite to the top of the back wall, or inclined only about one half towards that part, meeting a tiled roof at top half way, which should be raised high enough in front to throw the water off behind, as well as to admit as much sun as possible to every part of the frame: it may likewise be constructed with an upright front of glass, head high, and a sloping roof of glass-work, ranging from the upright front to the top of the back wall, which is the most eligible form, both for convenience and benefit of the plants; either of which constructions may be erected detached, or against a south wall already built, which will serve for the back, and save some expense; the ends may either be of wood or brick, and should be glazed like the front, &c. and the glass-work in every part be made to move on and off, as well as to slide backward and forward to give air, and perform other necessary work. At one end, near the back wall, a door should be made to enter occasionally at, and within-side a pit formed for the bark-bed, three feet deep, part sunk, the greater part raised, continued the whole length and width, except about a foot and half alley to pass in to perform the necessary culture, as well as view and gather the produce of the different plants.

The pit within is to be filled with new tan in order to afford a proper heat for the growth and support of the plants that are to be cultivated. See HOT-BED.

Where fire-heat is to be employed, the frame must be formed of brick-work, at least the back or main wall, for the convenience of having fire-flues, and the whole front, &c. be glass like the other sorts; the length may be from twenty to forty or fifty feet, or more, though one fire will not warm more than that length; the width from five or six to twelve or fifteen feet, and eight or ten high. In this case the fire is burned in a furnace behind at one end or middle, thence communicating the heat by internal flues or funnels running the whole length of the back wall in three or four returns one above another, and continued in one or two flues in the front. And frames thus constructed may be contrived either of moderate width for one row of trees only, to range against the back wall, or may be capacious enough to have a range of trained wall-trees behind, and some small

half or full standards, ranging also from the back to the front, or entirely for standards, especially those of cherries.

Where it is intended to have a narrow frame for only a row of trained trees behind, the width of from four to five or six feet is sufficient, having the back or main wall formed of brick or stone, as just observed, eight or ten feet high, with several flues within-side, returned over each other, running the whole length of the wall; in the front must be a low wall a foot high, on which to lay a plate of timber, and from which are ranged glass frames or lights in one continued slope to the top of the back wall, there received into proper frame-work; but for the greater convenience, the lights may be in two tiers or ranges, an under and upper tier, the upper range made to slide up and down over the others, but so that all the glass-work can be moved away occasionally, to admit the full air to the trees after the work of forcing is over: the whole bottom-space within the frame should be of good loamy earth, or any good garden mould, two spades deep, which should be dug or trenched in the common way; then a range of trees planted behind, towards the wall, two or three yards asunder, erecting a trellis behind them, upon which to train the branches as against a wall or espalier. Other inferior plants may likewise be set in the border or in pots, in front of the trees.

In forcing-frames of this construction, from forty or fifty feet long may be sufficient; but if longer, two furnaces for fires are necessary. See **HOT-HOUSE**.

Different sorts of frames of this nature may be seen in the plates on **FORCING-FRAMES, HOT-HOUSES, &c.**

In the first sort of forcing-frame, various kinds of fruits may be produced both of the dwarf fruit-tree and other kinds, as well as different sorts of vegetables and plants of the flowery and other kinds.

Frames of this sort may have such dimensions as to have substantial hot-beds prepared within them, for the purpose of receiving many different sorts of potted plants.

And in the second sort of frame, from the heat being more regular and lasting, a still greater variety of the finer sorts of fruits, and the more tender flowers and other vegetable productions may be produced, not only long before they could be raised in any other way, but with much greater ease and convenience, as well as with greater certainty.

The last kind of forcing-frame is employed in furnishing many of the finer sorts of fruits, that require higher degrees of heat to procure

them in the utmost perfection, such as pine-apples, grapes, apricots, peaches, nectarines, and various others, as well as many tender sorts of vegetables, and numerous plants of the curious flower and other kinds.

FORCING-GROUND, the portion of ground in a garden that is destined to the purpose of forcing or raising vegetable productions by means of artificial heat. Grounds of this sort should always be detached from the garden, and situated as near to the stable as the nature of the land will admit, in order that dung may be conveyed to them with as much ease and convenience as possible, litter prevented, and the disagreeable appearance of the beds concealed.

It is necessary in most situations, and particularly in such as are exposed, to have them inclosed with a fence, either of brick-work or paling, six or eight feet in height. They should have sufficient space for containing a suitable number of frames and pits, and such linings as may be necessary in the working of them. And it is of great advantage in raising many sorts of tender crops, both of the vegetable and fruit kind, to have four- or six-feet borders made round them in a raised manner.

Where melons are raised, it is usual to have brick pits coped with stone or wood. Those which are most convenient, according to Mr. Forsyth, are such as are about twelve feet in width and two and a half in depth; the length in proportion to the number of frames employed. They are, however, often made of much smaller dimensions, especially where the extent of forcing-ground is but small.

In regard to the size of the lights for early melons, the above author advises, that they should be five feet in length and three in breadth; and for others, six feet in length and four in breadth, the former being four- and the latter three-light boxes. See **FRAME**.

In constructing the pits, nine-inch walls will be sufficient, square spaces of wood being built in the upper parts of them, where wood copings are made use of, to nail them to. As wood decays rapidly, stone should be preferred. Sometimes the walls are not built solid, but square openings left, so as to admit the heat from the outsides. See the plate annexed.

Mr. Forsyth directs, that there "should be a walk between the ridges about six or seven feet broad, sufficient to admit a cart to carry dung," as being more expeditious than wheeling it in. "The walk should be made up as high as the coping, and sloping gently towards each end," being laid in the bottom with brick rubbish, and covered over with sea-coal ashes or sand. By

this means, after the linings are made up, it may be kept perfectly neat and clean. A loose drain will likewise be necessary in the middle of the bottom of the pit, for conveying off wet and the oozing from the dung, to a tank or cistern constructed for its reception. The fluid thus collected, may be made use of in watering cabbage and other plants of the same kind.

FORCING-PIT, a sort of pit constructed of brick-work, with fire-flues, in various ways, for the purpose of making tan- or other hot-beds in being covered with glass frames.

It is useful for receiving different sorts of tender potted plants which require considerable degrees of heat in their cultivation. See **BARK-PIT**.

FORCING-WALL, a wall constructed with flues for the purpose of conveying and communicating fire-heat, in order to ripen various kinds of tree fruits that are planted and trained against them, and which are protected in the front by glazed frames. See **HOT-WALL**.

Walls of this sort should always be erected in warm sheltered situations, and have southern aspects, in order that they may derive the greatest possible advantage from the influence of the sun.

FOREST-TREES, such trees as grow to a large size, whether of the deciduous or evergreen kinds, and are fit for the purpose of timber. Of this sort of trees there are a great many different kinds; but those principally employed as timber are: the Oak, Ash, Elm, Beech, Chestnut, Maple, Birch, Alder, Poplar, Larch, Pine, &c. And for the purposes of ornament, these as well as many others may be had recourse to; such as the Mountain-ash, Lime, Horse-chestnut, Willow, &c. and all the different sorts of Fir, Box, Holly, Yew, Cypress, &c.

They are raised in different methods according to their kinds, as may be seen under their respective genera, but chiefly by seeds, layers, and cuttings.

In forming plantations with these sorts of trees, whether by sowing the seeds or setting the young plants, great care should be taken to adapt them as much as possible to the nature of the soils and situation, as some sorts succeed well on one kind of soil and others on another. Thus the Oak, Elm, Maple, and Birch, answer well on all the deeper kinds of soil; while those of the Ash, Beech, Chestnut, Mountain-ash, Larch, Pine, Box, Holly, Yew, &c. thrive the most perfectly where the soils are more light, dry, and friable. But the Alder, Willow, Poplar, and some others, grow in the greatest perfection where there is a greater degree of moisture. The Beech, Mountain-ash, Larch, and some others, likewise succeed well in exposed situations. See **PLANTATION**.

FOSSE, a sort of sunk fence or haw-haw made

on the outsides or boundaries of ornamented grounds, in order to extend the prospect in an uninterrupted manner. Fences of this nature are formed of different depths and breadths, according to circumstances, but six or seven feet in depth and ten or fifteen in width are the most common. Where the extent of pleasure-ground is inconsiderable, these fences give the particular parts of the garden or grounds an air of larger extent than it really possesses, as at a distance nothing of them is seen, so that the adjacent fields, &c. appear to be connected with them: where the pleasure-ground is situated near to a park, paddock, or any spacious field open to an agreeable prospect, they are often continued round, as far as they are agreeable from the walks of the pleasure-grounds.

Works of this kind are formed in different ways, but always so as to serve the purpose of fences and afford an uninterrupted view.

One method of constructing them is with an upright side next the garden or pleasure-ground, or in the contrary direction, according to circumstances and situation, five, six, or seven feet deep, faced with a wall of brick, stone, or strong post and planking; the other side being made sloping outward from the bottom of the upright wall, &c. gradually, with an easy slope to fifteen or twenty feet distance, or more, so as to render the declivity as easy and imperceptible as possible, both to take off all stiff and ditch-like appearance, and that when in a field or park, no ground may be lost from its being capable of being converted into grass. The top of the upright side should be made nearly upon a level with the adjacent pleasure-ground, and always a little higher than the top of the slope on the opposite side, being laid with grass, corresponding to the adjoining garden or pleasure-ground, unless it be thought convenient to continue a gravel walk that way; in which case, a proper verge of grass should constantly be preserved between the walk and the edge of the fosse; the sloped side should also have its top always nearly on a level with the adjacent ground of the field, park, or part where it is formed; and the side finished with a regular slope from top to bottom, being also sown or laid down in grass, which will always preserve the slope in due form, and have an agreeable appearance to the sight.

When, in forming this kind of fosse, by reason of wet it cannot be got deep enough to form the upright sufficiently as a fence, a chevaux-de-frise of wood-work may be erected along the top, projecting outward in a nearly horizontal position, or as much so as to rise but very little above the level of the top of the perpendicular side on which it is fixed, that it may not obstruct the

view, or be very perceptible from the garden or pleasure-ground.

Another fence of this sort is formed with both sides sloping, and in perpendicular depth from four to five or six feet, having a fence near that height arranged along the bottom; the sides being sloped gradually from the bottom to ten or twenty feet width, or more, at top; as the more easy and imperceptible the slope the better, particularly on the field side. The sides must be sown or laid with grass. In this, as both sides are sloped, a fence along the bottom is necessary as a defence against cattle, &c. which may be either strong paling, or any kind of palisado-work, the height in proportion to the perpendicular depth of the sunk fence, as the top should not be higher than that of the slopes.

In constructing the first sort of fences of this nature, begin by setting out the intended width by two ranges of short stakes; then level in the stakes by notching, according to the intended height of the top on each side, corresponding with the adjacent ground, making up both the top lines with earth firmly, according to the line of level marked on the stakes; then close along the side of the line of the intended upright side, proceed to dig a trench three feet wide, perpendicularly to the intended depth; and as you go on, work also the sloping side gradually down, still continue digging the trench perpendicularly next the garden, &c. till arrived at the proper depth; when level the bottom equally along according to the lines of level at top; and having proceeded so far, then, according to the line of level at top and bottom, trim and finish off the sloping side regularly, so as to form an even slope from the outside line at top to that at bottom: as to the upright side, a wall must be erected to the height of the line of level at top, making good the ground behind the wall, firmly, as the building advances, and finishing the top with a coat of turf level with the adjoining ground; at the same time also finish the slope, either by sowing it with grass-seeds, or laying it with turf, as most convenient.

In forming the second sort, set out the width by two lines of stakes; then level them in, and make up the ground of each line according to the mark of level, as before; then exactly along the middle, between the two lines of stakes, dig a trench two or three feet wide, to the intended depth of the fence, sloping each side a little as you go on, still continuing the trench perpendicularly, till arrived at the due depth; then, as in the former, level the bottom an equal depth, by stakes, agreeable to the lines of level at top: when this is effected, finish off both

slopes evenly from each line of level at top to that at bottom, and sow each slope with grass, or lay them with turf, as most proper. The fence along the bottom may be either close paling, rails, or palisadoes, as most convenient; the height proportionable to the depth of the fosse, but not higher, or at least but very little, than the line of level at the top of the fosse.

In the execution of the work in both cases the internal materials should be well trodden or rammed in, in order that the whole may be rendered perfectly solid, and prevented from sinking irregularly.

FOTHERGILLA, a genus containing a plant of the low under shrubby kind.

It belongs to the class and order *Polyandria Digynia*, and ranks in the natural order of *Amentaceæ*.

The characters are: that the calyx is an one-leaved perianthium, bell-shaped, close, truncate, short, permanent: there is no corolla: the stamina have very many filiform filaments, thicker at top, long: anthers minute, erect, quadrangular: the pistillum is an ovate, bifid germ: styles two, subulate, terminating, the length of the stamens: the pericarpium is a hardened, two-lobed, two-celled capsule: lobes two-valved: the seeds solitary and bony.

The species is *F. alnifolia*, Alder-leaved Fothergilla.

It is a tree having the appearance and leaves of Alder. The leaves are alternate, petioled, wedge-shaped, entire, serrate at the tip, serratures very large and few, the upper surface green, the lower hoary, the younger ones white with nap underneath. The flowers in a close spike at the end of the stem, like an oblong head, and white. Capsules large, ovate, very hirsute, sharp, two-celled: the valves opening into four points, until the seeds are ripe. The flowers come out in the beginning of spring from the buds at the end of the branches before the leaves, and are of a white colour. It is a native of North America, flowering from April to June.

There are varieties of it, with broad leaves, and with narrow leaves.

Culture.—These plants are raised with facility, by parting the roots in the autumn or spring season, and planting them out in the places where the plants are to grow.

They afford ornament and variety in the fronts of the borders and clumps in pleasure-grounds, among others of similar growth; and from their hardy nature require little trouble.

FOX-GLOVE. See *DIGITALIS*.

FRAGARIA, a genus comprising a plant of the low herbaceous perennial hardy fruit kind.

It belongs to the class and order *Icosandria*

Polygynia, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is an one-leaved, flat, ten-cleft perianthium: divisions alternately exterior and narrower: the corolla has five petals, roundish, spreading, inserted into the calyx: the stamina have twenty subulate filaments, shorter than the corolla, inserted into the calyx: anthers lunular: the pistillum has numerous germs, very small, collected into a head: styles simple, inserted at the side of the germ: stigmas simple: there is no pericarpium: common receptacle of the seeds (vulgarly called a berry) ovate, pulpy, soft, large, coloured, truncate at the base, and deciduous: the seeds numerous, very small, acuminate, scattered over the surface of the receptacle (a little compressed, smooth, glittering).

The species cultivated is *F. vesca*, Esculent Strawberry.

It is distinguished by its thick fibrous root, the long slender runners which it throws out from it, which at the joints strike root and form new plants, by its ternate leaves, and its remarkable fleshy receptacle, commonly called a berry, but having the outer surface studded with seeds. The flowers are small and white, on slender stems, six or seven inches in height.

There are several varieties cultivated, of which the following are the principal.

The *Wood-Strawberry*, which has the leaflets oval-lanceolate, acutely serrate; the petioles woolly; the runners slender, smooth, often tinged with purple: peduncles with two or more flowers. The fruit small, and usually red: it has commonly little flavour here, from the plants being too much shaded in woods and hedges.

The sub-varieties of which are: the *White Wood-Strawberry*, which ripens a little later in the season, and is often preferred to it for its quick flavour, but as it seldom produces such large crops of fruit as the red sort, it is not so generally cultivated.—The *Alpine Strawberry*, which is a larger plant than that which grows in woods, the stem higher, the leaves broader, the fruit larger, red, and usually much pointed, sometimes white. It is well flavoured, and the plants continue long in bearing, which renders them very valuable. The reason of this is, that the runners which it throws out during the summer shoot up into flower and fruit the same year more freely than in the other sorts. It is sometimes termed *Everlasting Strawberry*.—The *Rough-fruited* or *Prickly Strawberry*, which Martyn thinks nothing but an accidental variety, has the flower greenish; the fruit harsh, rough and prickly, of a greenish colour with some show of redness.

The *Hautboy Strawberry* is very different from the rest in leaf, flower, and fruit. The leaves are larger, thicker, hairyish, and rough. The fruit very large, and of a pale red colour. It varies with oval, pine-shaped, and green fruit; with red blossom, with white striped leaves, and with yellow striped leaves.

There is also an improved sub-variety of it, called *Globe Hautboy*; the fruit of which is larger, and of a globular form. Martyn observes that "where these are neglected, they degenerate to the Common Hautboy; but where the soil is good, and the culture well managed, the plants will produce a great quantity of large well-flavoured fruit."

This variety of Strawberry is very apt to degenerate, and to produce only dry effete fruit; which, according to Mons. Duhamel, is owing to there being two sorts of plants, one bearing male, the other female or rather imperfect hermaphrodite flowers, the former of which, being reputed useless, are carefully destroyed; hence not only the seeds become abortive, but the receptacle, commonly called the fruit, small and juiceless. This Martyn thinks "may be remedied, either by planting a few of the male plants, or of the Scarlet or Pine Strawberry among the Hautboys."

The *Chili Strawberry* has the leaves hairy, oval, and of a much thicker substance than any sort yet known, and stands upon very strong hairy foot-stalks; the runners from the plants are very large, hairy, and extend to a great length, putting out plants at several distances. The peduncles are very strong; the leaves of the calyx long and hairy. The flowers are large, and often deformed; and so is the fruit, which is very large. When cultivated in very strong land, the plants produce plenty of firm well-flavoured fruit; but as it is a bad bearer in most places, it has been lately less cultivated.

According to Frezier, the fruit usually attains the size of a walnut, but is sometimes as large as an egg, of a paler red than the European Strawberry, and not so quick in its flavour. It deserves cultivation for the singularity and size of the fruit.

It varies with round pale red, with globular pale red, with oblong-oval pale red, and deep red fruit. There is also Carolina scarlet and white fruited; Royal large red; Large Dutch, Bath, and Devonshire Chili Strawberry.

The *Scarlet Strawberry*, which is the sort first ripe.—The fruit is good, being preferred to most others by many. It was brought from Virginia, where it grows naturally in the woods. It is very different from the Wood-Strawberry, in leaf, flower, and fruit. The leaves being of

a dark green and of a more even surface, the flowering-stems shorter, the fruit being frequently concealed among the leaves.

It varies with roundish leaves, and with striped leaves.

The *Pine Strawberry*, in which the leaves have a great resemblance to those of the Scarlet Strawberry; but are larger, of a thicker substance, and the indentures of their edges blunter; the runners are much larger and hairy; the peduncles are stronger, the flowers much larger, and the fruit approaches in size, shape, and colour to the Chili Strawberry. It produces a great quantity of fine large fruit, when the plants are kept clear from runners.

According to Mons. Duhamel, it is raised from the seed of the Chili Strawberry. The flower is very large, and the fruit has something of the smell and taste of the Pine-apple. It varies in the form of the fruit with ovoid, with oblate spheroid, and with irregular fruit. It is much smaller than the Chili Strawberry. There are also the Green, Red, and Hautboy-fruited, as well as the Chili Pine-apple Strawberry.

The *Carolina Strawberry*, which greatly resembles the above, but is much less in all its parts, and less hairy: the flower-stems are shorter: the flower-buds more lengthened out, and less swollen: the fruit smaller, more regular in the form, of a higher colour, but the perfume not so pleasant. Martyn remarks that "the Pine varies little when raised from seed, whereas this varies much in the flower, fruits, &c."

Culture.—In order to raise this sort of fruit to the greatest advantage and perfection, the soil should be of the friable loamy kind, with a moderate degree of moisture.

All the different varieties may be made use of where large supplies are wanted; but in other cases a few of the small and large sorts may be sufficient. The same varieties should always be planted together in separate beds, or other places, but never any mixture of different sorts admitted.

The usual practice in forming beds of this sort of fruit is by planting out the offsets taken from the sides of the old plants, or such as are formed from the rooting of the joints of the runners; but the former are in general the better plants. And in choosing them, they should never be taken from such plants as are old, and which have been neglected in their culture, but constantly from such as have been well kept in order, and are in a full bearing state; such offsets as stand nearest to the old plants being preferred to such plants as are formed by the trailing stems at a distance. Upon a careful attention to these circumstances much of the success of this sort

of culture depends. In some of the varieties, as those of the wood kind, the offsets are best when taken from the wild bearing plants; as they are not so liable to run as those taken from the cultivated sorts.

These offsets or plants are mostly of sufficiently strong growth the first year for being made use of; but when this is not the case, they may be set out in nursery rows till they have attained a full growth.

In preparing for plantations of this sort, the ground should be well trenched over and effectually cleared from all sorts of weeds, and after being laid quite level, formed into beds four feet in width, with paths of two feet or two feet and a half between them, for the convenience of cultivation and gathering the produce. The situation should be quite open, and have as much as possible a southern aspect. It is likewise a great advantage when the beds can be formed in a shelving or sloping manner towards the south, so as to have the full influence of the sun.

When the beds have been thus made up, they are in a proper state for being planted upon.

The most suitable time for performing this business is in the early autumn, as about the latter end of September or beginning of the following month, in order that the plants may be well rooted before the commencement of the winter frosts. Some, however, plant in the early spring; but there is more danger of the plants being destroyed by the heat of the summer.

In executing the work, the plants or offsets should be put in by means of a line and dibble, in rows lengthways of the beds, at different distances, according to the kinds.

The most usual distances are, for the wood sort twelve or fifteen inches each way; and eighteen inches for the Scarlets, Hautboys, Chili, Alpine, and other large kinds. Much advantage is always gained by letting them have sufficient room. It is usual to set them out in the quincunx order, and great care should be taken in the work of planting, to close the mould well to the roots of the plants as they are set out. When the whole has been done, they should have a good watering to settle the earth well about their roots.

But besides this mode of planting upon beds, they succeed well on the fronts of clumps, borders, and other parts of pleasure-grounds, especially when set so as to have a due degree of sun, and without being too much shaded.

When new varieties of this sort of fruit are wanted, the propagation must be effected by sowing the seed produced on the fruit, when

perfectly ripened, either in the spring or autumn season, on a bed of light earth, or in pots placed in the shade.

After the plants have been set out as above, and taken new root, care is necessary, if the winter prove severe, to lay some old tanner's bark over the surface of the bed between the plants, to keep out the frost: this is absolutely necessary in the Chili sort, as the plants are frequently killed in hard winters when exposed without any covering: where tanner's bark cannot be easily procured, saw-dust, or sea-coal ashes may be used; or even the decayed leaves of trees, or the branches of evergreen-trees with their leaves upon them laid over the beds.

In the following summer the plants should be constantly kept clean from weeds, and all the runners be pulled off as fast as they are produced; as where this is constantly practised the plants become very strong by the following autumn; but when neglected, and the runners permitted to stand during the summer, and then pulled off in the autumn, they are not half so strong, nor will there be near the same quantity of fruit upon them the following spring, or so large and fine. Where proper care is taken of the plants the first summer, there is generally a plentiful supply of fruit the second spring after planting.

When the plants are in blossom, if the weather prove dry, good waterings given occasionally prove very beneficial in promoting a plentiful production of fruit, but in other cases it is unnecessary.

In the general culture of this sort of fruit, as the old plants are those which produce the fruit, the suckers seldom affording any till of a full year's growth, it is obviously necessary to divest them of them, as when suffered to remain they rob the fruitful plants of their nourishment in proportion to their number; and, besides, the suckers render each other weak, and thus cause barrenness. In the Alpine sorts the summer runners should not however be removed as they produce fruit.

Where the old plants are constantly kept clear from suckers, they sometimes continue fruitful four or five years without being replanted. It is, however, a good way to have a succession of beds, that after three years standing they may be taken up, as by that time they have mostly exhausted the ground. This sort of plants are also in general more productive on new land.

After having been thus cut and managed in the summer season, it will be necessary in autumn not only again to divest them of these strings or runners, but of all the decayed leaves, and to clear the beds from weeds; then the paths

should be dug up, and the weeds buried, some earth being laid over the surface of the beds between the plants, which will strengthen them, and prepare them for the following spring; and if after this there be some old tanner's bark laid over the surface of the ground between the plants, it will be of great service to them. In the spring, when the danger of hard frost is over, as in March, the ground between the plants in the beds should be forked over with a narrow three-pronged fork, to loosen it and break the clods; and in this operation the tan which was laid over the surface of the ground in autumn will be buried, and be a good dressing to the Strawberries, especially in strong land. This should be done whether the plants are in distinct bunches or in large beds.

And about the beginning of April, Martyn observes "if the surface of the beds be covered with moss, it will keep the ground moist, and prevent the drying winds from penetrating the ground, and thereby secure a good crop of fruit; and also preserve the fruit clean, that when heavy rains fall after it is full grown, there will be no dirt washed over them, which frequently happens, so that it must be washed before it is fit for the table, which greatly diminishes its flavour."

It is of great utility in dry seasons to water occasionally every summer, while the plants are in blow and forming their fruit; but as it approaches maturity this should be left off, as it injures the flavour.

And in some of the more fine sorts, or curious large varieties, when ripening, it is eligible either to tie up the stalks with the bunches of fruit thereon to sticks, or the leaves and stalks together; so as, in either way, to elevate the fruit from the earth, more out of danger of rotting by wet if a rainy season, and to more effectually enjoy the full sun to ripen with a good flavour; or sometimes place flat tiles on the ground round each plant of a few particular sorts, for the fruit to rest upon, drier and more secure from rotting by the damp of the earth, and to ripen with an improved flavour by such means.

As the fruit ripens in June and the following months, it should be gathered daily; being plucked off in the cup, with about half an inch of the stalk adhering, by which means they are not so liable to be bruised, and appear more conveniently when served at table, and are more agreeably picked up out of the dish or basket for eating. The Wood-strawberries are however very commonly gathered without any stalky part, being generally picked clean out of their cups, especially when designed to eat with cream, &c.

Culture in Hot-houses, &c.—Besides the above method of raising this sort of fruit in the natural ground, it may be brought to perfection at a much earlier period by forcing in hot-houses, glass-frames, against hot-walls, and under common dung or bark hot-bed frames, &c.

The sorts most suitable in this intention are the different smaller sorts, as the *Scarlet*, the *Alpine*, and the *Wood Strawberry*. The *Haut-bois* grows too large for this purpose.

In providing sets, great care should be taken to have them from the most fruitful plants, and those which grow immediately to the old plants; they should be taken off in autumn, and each planted in a separate small pot filled with loamy earth, being placed in a shady situation till they have taken root; after which they may be removed to an open situation till the middle or end of November; when the pots should be plunged into the ground up to their rims, to prevent the frost from penetrating through the sides. When placed near a wall, pale, or hedge-fence, exposed to the east or north-east, they succeed better than in a warm situation, as they are not forced too forward; after this they only require to be secured against frost.

In the spring following the plants will have filled the pots with their roots by the end of April, when they should be turned out of them and their roots pared, and replanted into penny pots filled with the like loamy soil, and replunged into the ground, in a shady situation, to remain till the following summer; during which time they must be kept clean from weeds, and have all the runners taken off as fast as they are produced. And if there should be any flowers produced, they should be pinched off, in order to have the plants as strong as possible.

Towards the end of October, or earlier if the season prove cold, the pots should be removed into a warmer situation, to prepare them for forcing; as they should not be suddenly removed from a very cold situation into the stove or hot-bed, but be gradually prepared for it. Where they are designed for the borders near hot-walls, they may then be turned out of the pots and planted, that they may have time to get fresh rooted before the fires are made to heat the walls; and they may be placed very close to each other, as they are designed to remain there only till they have ripened their fruit.

When the fires are lighted about the latter end of December, the strawberries in the borders will be ripe the end of March; but if the season should prove very cold, it will be the middle of April before they are fit for the table.

When intended to be forced in a pine-apple stove, and there is not room to plunge them in the tan-bed, the plants should be transplanted into larger pots in September, that they may be well rooted before they are removed into the stove, which should not be till December.

If placed under a frame the beginning of November, to be screened from frost, it will prepare the plants better for forcing. And where wanted early, a hot-bed should be made under frames, upon which the plants are put in the latter end of October, by which they are brought forward to flower, and then removed into the stove, being placed as near to the glasses as possible, to have the full influence of the sun and air; as when placed to the back the plants draw up weak, and the flowers drop without producing fruit.

In the management of the plants in the first mode, there must be care taken to supply them with water when they begin to show their flowers, otherwise they will fall off without producing fruit; and, in mild weather, fresh air should be admitted to them every day. And in the stove method, as the earth in the pots will dry pretty fast when they stand upon the pavement of the hot-house, or on shelves, they must be duly watered; but not too much given at a time, which would hurt them.

Where properly managed, they produce ripe fruit in February.

When the fruit has been wholly gathered from the plants, they should be put out of the stove, and from the borders near the hot-walls, that they may not rob the fruit-trees of their nourishment.

There is another method of ripening this fruit early, which is on hot-beds, where there is not the above conveniences. The plants are prepared in pots in the above manner, and placed in a warm situation in the beginning of October: about December the hot-bed is made in the same manner as for Cucumbers, but not so strong; and when the first violent steam is over, some old rotten dung, or, what is better, neat's dung, laid over the hot-bed to keep down the heat. The plants should then be plunged in the pots into the bed, as close together as possible, filling up the interstices between them with earth. They must afterwards have air admitted to them every day; and, if the heat of the bed is too great, be raised up, to prevent their roots being scorched. But when too cold, the sides of it should be lined with some hot dung. This bed brings them to flower by the end of February, or the beginning of March, when another mild hot-bed must be prepared to receive them. Upon the hot dung some neat's dung about two

inches thick, being spread equally to prevent the heat from injuring the roots of the plants, and upon this two inches of a loamy mould; when this has lain two days to warm, the plants should be taken out of the first hot-bed and turned carefully out of the pots, preserving all the earth to their roots, and placed close together upon this new hot-bed, filling up the vacuities between the balls with loamy earth: the roots of the plants soon strike out into the fresh earth, which strengthens their flowers, and causes the fruit to set in plenty; proper care should then be taken to admit fresh air to the plants, and supply them properly with water, that they may produce ripe fruit in April.

By these means a succession of this fruit may be obtained from March, April, or even earlier; and in the open air from June to October and November, should the weather prove mild; for not only the Alpine but the White Wood Strawberry will continue bearing in tolerable abundance until the autumn frosts come on; especially in warm situations and soils not too light.

FRAME, GARDEN, a sort of box furnished with glass covers or lights at top to slide, used in gardens for protecting and forwarding tender and early plants of different kinds.

Frames of this sort are mostly formed of inch-or-inch-and-quarter deal-board, made of different dimensions, the largest about three yards and a half long, and one and a half wide, as high again or more in the back as in front, to give the top a due slope to the sun, and proper declivity to carry off the wet, when covered with glass lights occasionally as they are wanted.

Common Kitchen-garden Frames may be of three different sizes, as, for one light, two lights, and three lights; the two last of which, however, are the most material, and employed for general uses: but it is necessary to have one or more one-light and two-light frames, especially in private gardens, the former as a seed-frame for a small hot-bed, particularly the seeds of cucumbers and melons for the early crops, and other tender plants; and the latter as a nursery-frame to the young plants of the same kinds, &c., to forward them to a due size for the three-light frames.

The one-light frame may be about four feet and a half width from back to front, and three feet six the other way; fifteen or eighteen inches high in the back, and from nine to twelve inches high in front, with a glass sash or light, made to fit the top completely, so as to slide up and down and remove when necessary. And the two-light frame may be seven feet long, four

and a half wide, and fifteen or eighteen inches high in the back, and from nine to twelve in front, having one cross bar, three inches width, ranging from the middle of the back at top to that of the front, serving both to strengthen the frame and help to support the lights; the two lights to be each three feet six wide, made to fit the top of the frame exactly. But a three-light forcing-frame should be ten feet six inches long, four and a half wide, and from eighteen inches to two feet high in the back, and from nine to twelve and fifteen inches in front; those designed principally for the culture of melons being rather deeper than for cucumbers, as they generally require a greater depth of mould or earth on the beds; though frames eighteen or twenty inches in the back, and from nine to twelve in front, are often made to serve occasionally, both for cucumbers and melons; each frame should have two cross bars ranging from the top of the back to that of the front, at three feet six inches distance, to strengthen them and support the lights: the lights should be each three feet six inches wide; the whole together being made to fit the top of the frame exactly every way.

They are sometimes made of larger dimensions than the above, but they are very inconvenient to move to different parts where they may be wanted, and require more heat to warm the internal air: in respect to depth, if they are but just deep enough to contain a due depth of mould and for the plants to have moderate room to grow, they will be better than if deeper, as the plants will be always near the glasses, which is an essential consideration in early work, and the internal air be more effectually supported in a due state of warmth; as the deeper the frame, the less the heat of the internal air in proportion; and the plants, being further from the glasses, will be disadvantaged in their early growth; for which reason London kitchen-gardeners have often many of their forcing-frames not more than fourteen or fifteen inches high behind, and eight or nine in front, especially those which are intended to winter the more tender young plants, such as cauliflowers, lettuces, &c.; and those for raising early small salad herbs, radishes, and many others.

But when for the protection of taller plants, they should be deeper in proportion. If designed as a nursery-frame for young pine-apple plants, three feet six, by fifteen or eighteen inches, is the proper depth; arranging the largest plants behind, the young yearling ones more forward, and the crowns and suckers of the year in the front of all: a frame of these dimensions may serve also for any of the hardier

kinds of low green-house plants, as myrtles, &c., where there is not a proper green-house, or as an easement to it when too much crowded. It is useful also as an occasional winter shelter to many sorts of curious young plants, ever-greens and others of the full ground, which, being tenderish in their younger growth, require protection for two, three, or more years, till they increase in strength, and are gradually hardened to the full air.

Deep sorts of frames are sometimes made use of in the culture of particular sorts of plants, to bring them up to a proper height. See **DRAWING FRAME**.

In all these sorts of frames, the wood-work of the backs, ends, and fronts should be of such thick deal as has been mentioned, which must be all neatly planed even and smooth on both sides; and the joints, in framing them together, be so close that no wet or air can enter; the cross bars or bearers at the tops, for the support of the glasses, should be about three inches broad and one thick, and neatly dove-tailed in at the back and front even with both edges, that the lights may shut down close, each having a groove or channel along the middle to conduct off all wet falling between the lights: at the end of each frame, at top, should be a thin slip of board four inches broad, arranged from back to front, joining close up to the outside of the lights, which is necessary to guard against cutting winds rushing in at that part immediately upon the plants, when the lights are occasionally tilted behind for the necessary admission of fresh air, or other purposes. In regard to the lights, the wood-work of the frame of each should be inch-and-half thick, and two-and-half broad; and the bars for the immediate support of the glass-work about an inch broad, and not more than inch-and-half thick; as, when too broad and thick, they greatly intercept the rays of the sun. They should only be just sufficient to support the glass-work without bending, and be ranged from the back part to the front.

The glass-work may either be laid in lead and well trimmed with cement, air and water tight, or in the bars of wood in putty, lapping at the ends: the latter method is by some preferred, as being more effectual for the discharge of wet, the lapping of the panes being left open or unputtied at bottom, that the rank vapour naturally arising in hot-beds, and all condensed drops against the glasses, may be discharged at these places, as well as admit a perpetual moderate current of fresh air, which may be beneficial to the plants: this mode, however, of leaving the lappings open, is by some objected

to, especially for very early work, on account of the too free admission of air in cold weather.

All the wood-work, both of the frames and lights, should be painted in oil, to preserve them from decay; a lead colour will be the most eligible, and if done three times over, outside and in, will preserve the wood exceedingly from the injuries of weather, and from the moisture of the earth and dung.

Frames for these purposes are sometimes made in a sort of hollow brick-work, so as to admit the heat from without. See plate on **FORCING FRAMES**.

FRAME-WORK, that sort of forcing or raising vegetable productions that is effected by means of frames and artificial heat.

FRAMING, the art of raising different sorts of tender plants and vegetable productions to perfection at an early period, by the use of frames and hot-beds, or by heat applied in some other way.

FRAXINUS, a genus containing plants of the hardy deciduous tree kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Se-piariæ*.

The characters are: that in the hermaphrodite there is no calyx: or a one-leaved, four-parted perianthium, upright, sharp, small: there is no corolla: or four linear petals, long, sharp, upright: the stamina consist of two upright filaments, much shorter than the corolla: anthers upright, oblong, four-furrowed: the pistillum is an ovate, compressed germ: style cylindric, upright: stigma thickish, bifid: there is no pericarpium, except the crust of the seed: capsule two-celled, leafy, and flattened at top: the seed lanceolate, flattened, and membranaceous, one-celled: female the same, except that it has no stamina.

The species are: 1. *F. excelsior*, Common Ash-tree; 2. *F. rotundifolia*, Manna Ash-tree; 3. *F. ornus*, Flowering Ash-tree; 4. *F. Americana*, American Ash-tree.

In the first the leaves have generally five pairs of leaflets (four to six), and one odd one, of a dark green colour. The flowers are produced in loose spikes from the side of the branches, and are succeeded by flat seeds, which ripen in autumn. The lateral buds produce the flowers, and the terminating one the leaves.

It is observed by Martyn, that, as "there are not only hermaphrodite and female flowers, but also male ones, this species should seem referable to the order *Trioecia*, and that care should be taken in observing the flowers; as in those which are hermaphrodite the germ which lies between the two stamens does not grow up till

some days after they appear, so that at first they appear to be male flowers." It flowers in April, or the following month.

There are varieties with simple leaves, lobed, and even ternate; with pendulous branches—or Weeping Ash; with variegated leaves, yellow and white; or gold-striped and silver-striped.

In the second species the shoots are much shorter, and the joints closer together than in those of the Common Ash: the leaflets are shorter, with deeper serratures on their edges, and of a lighter green: the flowers come out from the side of the branches, are of a purple colour, and appear in the spring before the leaves come out. It is of humble growth, seldom rising to more than fifteen or sixteen feet in height in this climate.

The third species, according to Miller, is a low tree, about the same height as the preceding: the leaves are composed of three or four pairs of sawed lobes, far asunder, terminated by an odd one, much smaller and narrower than those of the Common Ash, but serrate, and of the same dark colour: the flowers in large loose bunches at the ends of the branches, having petals: they are of a white herbaceous colour, mostly males, and appear in May.

There is a variety, the Dwarf Flowering Ash,

In the fourth species, the New England sort, according to Miller, "the leaves have but three, or at most four pairs of leaflets, placed far distant from each other, and the odd leaflet running out into a very long point, of a light green, and no serratures on their edges. It shoots into strong irregular branches, but does not grow to a large size in the trunk. And in the Carolina kind the leaves have seldom more than three pairs of leaflets, the lower being the least, and the upper the largest; these are about five inches long and two broad, of a light green colour, and slightly serrate; the midrib is taper, and has short downy hairs on it: the seeds broader than those of the Common Ash, and of a very light colour.

The first of these is called the White American Ash; and the second the Red American Ash. And there is a third variety named the Black Ash, in which the stem is erect, branching, twenty or thirty feet in height, with large very dark leaves composed of three or four pairs of lobes and an odd one, small flowers of a greenish colour, and broad blackish fruit. Other varieties may also be found in the nurseries.

Culture.—These plants may all of them be increased with facility by seeds, which in the common sort should be sown in the autumn, and in the others as soon as they can be obtained in the spring, on beds of light mould over

the surface, raking them in to the depth of nearly an inch. The young plants should be afterwards kept clear from weeds, and when they have had one or two years growth they should be removed into nursery-rows, and placed two feet asunder, and one distant in the rows, where they must remain till fit for being planted where they are to grow.

The three last sorts may likewise be raised by budding or grafting upon common Ash stocks, when of the size of a good bean stem. This business should be performed about the latter end of summer; but the plants raised in this mode are not so fine as those from seed, on account of the stocks growing with more rapidity than the heads.

These are the only methods by which the variegated varieties can be increased.

All the sorts may be introduced as ornamental trees; but those of the American kind are the most proper in small plantations or shrubberies.

The first sort is highly useful as a timber tree.

FRIAR'S COWL. See ARUM.

FRINGE-TREE. See CHIONANTHUS.

FRITILLARIA, a genus comprising plants of the bulbous-rooted perennial flowery kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Coronaria*.

The characters are: that there is no calyx: the corolla is six-petalled, bell-shaped, spreading at the base: petals oblong, parallel: nectary an excavation or pit in the base of each petal: the stamina have six subulate filaments, approximating to the style, the length of the corolla: anthers quadrangular, oblong, erect: the pistilum is an oblong germ, three-cornered, obtuse: style simple, longer than the stamens: stigma triple, spreading, blunt: (style trifid, with three stigmas:) the pericarpium is an oblong capsule, obtuse, three-lobed, three-celled, three-valved (superior): the seeds very many, flat, semi-orbicular on the outside, in a double row.

The species are: 1. *F. Meleagris*, Common Fritillary, or Chequered Lily; 2. *F. pyrenaica*, Black Fritillary; 3. *F. imperialis*, Imperial Fritillary, or Crown Imperial; 4. *F. Persica*, Persian Fritillary, or Persian Lily.

In the first the root is a solid bulb or tuber, about the size of a hazel-nut, white or yellowish white, roundish, compressed, divisible into several, inclosed by the withered wrinkled bulb of the preceding year as in a case. The stem from six to twelve, fifteen, and even eighteen inches in height, advancing considerably in length after flowering; it comes out from the side of the root, is simple, upright, round, smooth, glaucous, and not unfrequently pur-

plish : the leaves three or four, sometimes five or six, grass-like, distantly alternate, half embracing, round on the under, and hollow on the upper side, somewhat twisted and glaucous : the flower usually single, sometimes two, or even three, on the top of the stem, large, pendulous, at first somewhat pyramidal, but afterwards bell-shaped, chequered with purple and white, or purple and greenish yellow. It is a native of the southern countries of Europe, flowering in April and May.

There are numerous varieties ; the chief are, the Common Purple, the Blood Red, the Great Purple or Red, the White, the Double Blush, the Pure Yellow, the Chequered Yellow, the Great Yellow Italian, the Small Italian, the Small Portugal Yellow, the Black, and the Spanish Black.

The second species has a double fleshy bulbous root : the leaves are broader, and of a deeper green than in the first ; the lower leaves are opposite, but those above alternate : the stem a foot and half high, terminated by two flowers of an obscure yellow colour, and spreading more at the brim than those of the first sort, but turned downwards in the same manner. It flowers three weeks after it ; and is a native of France.

The third has a large round scaly root of a yellow colour, and a strong foxy odour : the stalk rises to the height of four feet or upwards ; it is strong, succulent, and garnished two-thirds of the length on every side with long narrow leaves ending in points, which are smooth and entire : the upper part of the stalk is naked, a foot in length : the flowers come out all round the stalk upon short foot-stalks, which turn downward, each sustaining one large flower. Above these rises a spreading tuft of green leaves, which are erect, and called the Coma. It flowers the beginning of April, and the seeds ripen in July.

The chief varieties are ; those with yellow flowers, with large flowers ; and with double flowers ; but that which has two or three whorls of flowers above each other makes the finest appearance, though it seldom produces its flowers after this manner the first year after removing.

The fourth species has a large round root : the stem three feet high, the lower part closely garnished on every side with leaves, which are three inches long and half an inch broad, of a gray colour, and twisted obliquely : the flowers are in a loose spike at the top, forming a pyramid ; shorter than the other sorts, spreading wider at the brim, and not bent down ; of a dark purple colour ; appearing in May. They seldom produce seeds in this climate.

There is a variety which has a much shorter stem and smaller leaves ; the stem branches out at the top into several small peduncles, each sustaining one dark-coloured flower. It is termed Dwarf Persian Lily.

Culture.—The common mode of propagation in all these plants is by off-sets from the sides of their roots, separated every second or third year ; the proper time for which is when their flower-stalks decay, taking the whole root up entirely, and separating them into distinct roots, then planting the smaller off-sets by themselves in nursery-beds, to remain a year or two, to acquire a flowering state ; and the larger roots, where they are to remain for flowering.

They are likewise capable of being propagated by seed ; but this is principally practised for new varieties ; and the process is tedious ; the Fritillary and Persian Lily being three years, and the Crown Imperial sometimes six or seven, before they flower in perfection. The seeds may be sown in the beginning of autumn, in large wide pots, or in boxes of similar width, filled with light mellow earth, each sort separate, covering them evenly with fine earth half an inch deep, placing the pots, &c. to have only the morning sun all summer, or during hot dry weather, and in the full sun in winter and spring : the plants will appear in the spring, which, after the first or second year's growth, when the leaves decay in summer, may be taken up, and the whole planted immediately in nursery-beds, in shallow drills four inches asunder, to remain till they flower.

They are all hardy, and highly ornamental plants for the borders, clumps, and other parts ; the fourth sort being set backwards, the third in the middle, and the others forwards.

FRUIT, the produce of various sorts of trees used as food, either in a raw or prepared state.

All sorts of fruit should be gathered from the trees or plants when perfectly dry, and never when in a dewy or wet condition. In many of the finer and more delicate fruits, it is of advantage not to permit them to remain on the trees till they are over ripened. In gathering them, the bloom should always be preserved upon them as much as possible. In the almond or peach, plum, and finer cherry kinds, it is usual to deposit them as soon as gathered, in shallow sieves or baskets, spread over with leaves.

In the gathering of apples and pears—as those which are shaken or beaten from the trees never keep well—Mr. Forsyth advises, that they should be all hand-picked, by means of a stage or steps contrived for the purpose, and other apparatus necessary for receiving and conveying

them away, some dried short cut grass being employed to prevent their being bruised on being deposited in them.

It is likewise observed, that great attention should be paid to their ripening, never gathering them at any particular period or season, as is often the case, on account of their becoming ripe at different times according to circumstances, but to be regulated by the sound fruit, when the trees are healthy, coming off into the hand without any force on being taken hold of: it should be picked off the trees and laid in the baskets and other places in a careful manner, so as to prevent bruising. When it is suffered to remain till it begins to fall itself, some well dried short grass mowings, pease-haum, barley-straw, or other similar dry material is recommended to be spread over the surface of the ground, to prevent the fruit being bruised by falling. But the fruit collected in this way should constantly be laid up separately, and made use of before that which was gathered by the hand; all such as are bruised being laid aside for immediate use.

After all the fruit has been gathered, the hay or straw should be raked up and removed.

When the fruit is wholly collected, it must be deposited in the store- or fruit-room, some of the dried short grass being previously spread over the middle part of the floor. It should be carefully laid in heaps from the baskets upon the dried grass, each sort separate; the heaps being from two to three feet in height, according to the quantity of fruit. When the heaps have been formed, they should be covered with the same material as was laid on the floor, to the thickness of two inches or more, in order that they may sweat. When they have remained in this state a fortnight, they should be opened and turned over, wiping each with a woollen cloth often dried, carefully removing those that were at the tops to the middle. After having continued eight or ten days more covered as before, the watery material will be sufficiently expended, when the fruit must be again looked over and wiped as in the former case, rejecting all such as are in the least degree injured.

While the process of sweating is going on, the windows of the room should be kept open, when the weather is not moist, to promote the exhalation of moisture. When the sweating is very considerable, it will be necessary to turn and wipe the fruit during the process.

Wheat-straw has been commonly made use of in laying up this sort of fruit; but Mr. Forsyth has found, that when any of the fruit begins to decay, if it be not quickly removed, the straw imbibes the moisture issuing from it, and communicates an unpleasant taste to such as is sound.

When fruit is stored up on shelves in the rooms, they are advised to have the bottoms covered with thin coarse canvass, at about eight-pence or ten-pence the yard, being placed upon it in single layers, after being wiped quite dry, care being taken not to lay them upon each other. They should then be covered with a piece of the same canvass, old news, or whited brown paper, to exclude the action of the air, guard against frost, and preserve the smoothness on the skin of the fruit. It should be turned two or three times in the course of the winter, to guard against rotting on the under side, all the damaged fruit being carefully removed each time.

In storing it in this manner, the earliest sorts should be placed on the lower shelves or drawers according as they come in, in this order; the nonsuch, golden rennet, and jenneting apples, and the burgamot and burre pears, as the jargonelle is found to keep best on the tree, rotting almost immediately on being gathered. In this way a proper succession of fruit may be provided.

As it requires much time in storing in this way where there is much fruit, it may be done in wet weather, and the evenings, when the men can be better spared than in the day-time.

Where there are not proper fruit-rooms, this sort of fruit may be kept in store-houses in baskets or hampers, placing soft paper in the bottoms and round the edges to prevent bruising them, laying a layer of fruit and a layer of paper alternately, covering the top with paper three or four times folded, to-guard against the air and frost.

The different sorts of fruit should be packed separately, and have labels fastened to them, so as to know their names, and the times of their being in a proper state for use.

The best way of keeping fruit is, however, Mr. Forsyth thinks, by packing it up in glazed earthen pans or jars. In doing which, the fruit should be first separately wrapped in soft paper; then a little well-dried bran applied over the bottoms of the jars, above which a layer of fruit should be placed, continuing them alternately, till the jars are quite full, when they should be shaken, and a little more bran added, covering the whole over with bladders to exclude the air, putting on the covers, which should fit in a close manner. The rooms in which these are placed should be capable of admitting a fire in moist weather.

In packing fruit for carrying, Mr. Forsyth thinks strong deal boxes of different sizes the most convenient and useful. Those which he employs are two feet long, having the breadth and depth of fourteen inches; and one foot nine

inches long, with one foot in breadth and depth. They are constructed of inch-deal, well secured by cramps at the corners, having a small iron handle at each end to secure them by. In these, melons, currants, cherries, pears, peaches, nectarines, plums, grapes, and other similar sorts may be carried, the heaviest fruit of each sort being put at the bottom, the first sort wrapped up in soft paper, and all the others, except the currants and cherries, first in vine-leaves and then soft paper. The other two are conveyed in flat tin boxes, about fourteen inches in length, ten in breadth, and four in depth.

In packing them, for the melons, a layer of fine moss and short soft dry grass well blended together is placed at the bottom of the deal box, then the melons packed in with it in a tight manner in every direction, choosing them as much of the same size as possible. When the melons are put in, a thin layer of moss and grass is placed over them, upon which the tin box having the currants and cherries packed in it by intervening layers of fine dry moss, so as to be quite full, is packed firmly in with grass and moss all round to prevent its moving; over which another thin layer of moss is spread, and the pears packed in closely in the same manner as the melons, proceeding in the same way with the other fruits, so as to close with the grapes, filling up with moss, so as that the lid of the box may shut down quite tight, and prevent rubbing. Each box should be provided also with a lock, and two keys to serve the whole, one for the packer, and another for the emptier. When the boxes are locked down, they should be well corded.

In this manner his majesty's fruit is sent to different places, and may be conveyed to any part of the kingdom. When it is only sent a short distance, the moss and boxes should be returned, and be kept well aired.

FRUIT-GARDEN, that sort of garden which is principally planted with trees for the purpose of affording fruit of different kinds. The situation of this sort of garden should be warm sheltered, and open to the south or south-west, in order that it may enjoy the full benefit of the sun, and of course ripen the fruit in the best and most perfect manner. See **GARDEN** and **ORCHARD**.

FRUIT-ROOM, an erection constructed for the purpose of storing up different sorts of fruit. They are formed of different dimensions according to circumstances, being lined with thin boards, and fitted up with shelves, bins, boxes, drawers, and other conveniences for the reception of fruit; all of which, as well as the floors, should be of white deal, as Mr. Forsyth

remarks, that when red deal is made use of for these purposes, it is liable to give a disagreeable resinous taste to the fruit and spoil its flavour: on this account, under other circumstances, he advises covering the shelves with canvass, &c. as mentioned in the preceding article.

FRUIT-TREE, is that which produces eatable fruit, either for the table or culinary uses.

There are many fruit-trees, fruit-bearing shrubs and shrubby plants that ripen their fruit perfectly in this climate, with their several species, and numerous varieties: the principal sorts of which are those of the almond kind, as the almond, peach, and nectarine trees; the plum sort, containing different kinds of plum, apricot, and cherry trees; the pear kind, comprehending various sorts of pear, apple, and quince-trees; the vine, containing many sorts of grape-trees; the fig, comprehending many sorts of fig-trees; the several sorts of medlar-trees; the different kinds of mulberry-trees; the chestnut and walnut-trees; the common nut kind, containing many sorts of filberts and other nut-trees; the currant-, goosberry-, and raspberry-trees, with many others; the nature and management of each of which will be fully explained under their respective genera.

FUCHSIA, a genus comprehending plants of the flowery exotic kind, for the stove.

It belongs to the class and order *Octandria Monogynia*, and ranks in the natural order of *Onagrace*.

The characters are: that the calyx is a one-leaved perianthium, funnel-form, coloured, superior, deciduous: tube ovate at the base, contracted above it, then gradually widening, patulous, angular: border short, four-parted; parts ovate, acuminate, spreading: the corolla has four petals, ovate, acuminate, sessile, spreading, the same length with the parts of the calyx: the stamina have four filaments (or eight) filiform, erect, inserted into the tube of the calyx below the middle, and a little longer than the tube: anthers twin: the pistillum is an inferior germ, ovate, below the insertion of the calyx constricted: style simple, the length of the stamens: stigma obtuse (club-shaped): the pericarpium is an ovate berry, four-grooved, four-celled: the seeds many, ovate, fixed in a double row to a columnar receptacle in the middle of the berry.

The species cultivated are: 1. *F. triphylla*, Three-leaved Fuchsia; 2. *F. coccinea*, Scarlet-flowered Fuchsia.

The first has a woody, branched, reddish root: the stem is herbaceous, upright, quite simple, reddish green, leafy, two feet high at most: the

leaves are lanceolate, entire, pale green, a little firm or coriaceous, sessile, disposed in threes: peduncles one-flowered, scattered, and forming a straight terminating raceme: the flowers large, very fine, of a very bright scarlet, having eight stamens, not projecting beyond the flower; and the berry is a little larger than an olive, fleshy, soft, reddish black, somewhat pubescent, of a very pleasant taste: the seeds small and brown. It is a native of St. Domingo.

The second species is a shrub, growing to the height of six or seven feet: the leaves are commonly opposite, on short petioles, of a fine green, having the veins tinged with red, with a fine down on them: the peduncles axillary, one-flowered, longer than the leaves: the flowers are pendulous, and of a bright scarlet colour. It is a plant of peculiar beauty, producing its rich pendent blossoms through most part of the summer: the petals in the centre of the flower are particularly deserving of notice, as they somewhat resemble a small roll of the richest purple-coloured ribband. It is a native of Chili.

Culture.—These plants are capable of being increased by seeds, layers, cuttings, and sometimes even by suckers. The seeds should be sown in pots of good light mould, plunging them into a bark hot-bed. When the plants appear, they should be kept clean, and be often refreshed with a little water. After they have attained a few inches growth, they should be shaken out of the former pots, and after being carefully separated and planted in separate small pots with the same sort of mould, be replunged in the hot-bed, and well shaded till they become fresh rooted, when air should be admitted pretty freely. They must be kept warm during the winter season.

The layers, cuttings, or suckers may be laid down or planted out in the latter end of summer or beginning of autumn.

They must all be kept in the stove during the winter season, but in the summer may be set out in the green-house.

They afford much ornament by their beautiful scarlet flowers.

FUMARIA, a genus containing plants of the tuberous-rooted low flowery perennial kind.

It belongs to the class and order *Diadelphia Hexandria*, and ranks in the natural order of *Corydalis*.

The characters are: that the calyx is a two-leaved perianthium: leaflets opposite, equal, lateral, erect, acute, small, deciduous: the corolla oblong, tubular, ringent, palate prominent, closing the throat: upper lip flat, obtuse, emarginate, reflex: the nectary the base of the upper lip prominent backward, obtuse: the lower lip en-

tirely similar to the upper, keeled towards the base: nectary the keeled base, but in this less prominent: the throat four-cornered, obtuse, perpendicularly bifid: the stamina consist of two equal filaments, broad, one within each lip, inclosed, acuminate: anthers three at the end of each filament: the pistillum is an oblong, compressed germ, acuminate: style short: stigma orbiculate, erect, compressed: the pericarpium is a one-celled silicle: the seeds are roundish.

The species are: 1. *F. cucullaria*, Naked-stalked Fumitory; 2. *F. sempervirens*, Glaucous Fumitory; 3. *F. lutea*, Yellow Fumitory; 4. *F. capnoides*, White-flowered Fumitory.

The first has a scaly root, the size of a large hazel-nut: the flower-stalk is eight or nine inches high: the root-leaves are in pairs, triternate, gashed, smooth, slender; with red petioles: the scape simple, round, length of the leaf, rufous: the raceme terminating, simple; the flowers (four or five) pendulous; of a dull white colour. It is a native of Virginia. Perennial, flowering in June and July.

The second species is annual: the stem upright, a foot and half high, round, and very smooth, sending out several branches at top: the leaves smooth, branching, pale, divided like the common sort, but the leaflets larger and more obtuse: the flowers in loose panicles from the sides of the stem and at the extremities of the branches, of a pale purple colour, with yellow chaps or lips: the pods are taper, narrow, an inch and half long, containing many small black shining seeds. It flowers during summer, and is a native of North America.

In the third, the root strikes deep into the ground: the stems are many, succulent, diffused, about six inches high: the leaves on long branching petioles, composed of many irregular leaflets, trifid at the top: peduncles axillary, naked, longer than the leaves, supporting eight or nine flowers, of a bright yellow colour, in a loose spike: the leaves continue green all the year, and the flowers in succession from April to October. It is very like the fourth species, but is perennial; and according to Miller, the stalks have blunt angles, are of a purplish colour; and the flowers grow in a looser panicle, on longer pedicles. It is a native of Barbary.

The fourth is annual: the stem four-cornered at the base: the leaves superdecompound, the terminating leaflets larger, and semitrid; the middle segment lobed; petioles three-cornered: the racemes naked: pedicles shorter by half than the corollas, blackish at the tip. There is a succession of the flowers from May

to October. It is a native of the South of Europe.

Culture.—The first sort of these plants may be readily increased, by planting off-sets from the roots in a light soil, in a shady situation, in the beginning of autumn, as soon as the stems begin to decay.

The other sorts may be raised by sowing the

seeds where the plants are to grow, as soon as they become perfectly ripened.

The only culture they demand afterwards is, that of keeping them free from weeds.

They are all very ornamental in the fore parts of clumps, borders, and other parts of pleasure-grounds.

FUMITORY. See FUMARIA.

G A L

GALANTHUS, a genus containing a plant of the bulbous-rooted flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceae*.

The characters are: that the calyx is an oblong spathe, obtuse, compressed, gaping on the flat side, withering: the corolla has three petals, oblong, obtuse, concave, lax, patulous, equal: nectary cylindric, three-leaved, half the length of the petals; leaflets petal-shaped, parallel, emarginate, obtuse: the stamina consist of capillary filaments, very short: anthers oblong, acuminate, ending in a bristle, convergent: the pistillum is a globular, inferior germ: style filiform, longer than the stamens: stigma simple: the pericarpium is an oval-globular capsule, obtusely three-sided, three-celled, three-valved: the seeds several and globular.

The species is *G. nivalis*, Snow-Drop.

It has the bulb coated and truncate: the leaves are yellowish at the base, callous at the tips: the scape half a foot or a span in height, ancipital, striated, involved at the base in a pair of leaves: the sheath whitish, truncate, involving the leaves and scape: the peduncle usually comes out from the left cell of the spathe, is weak, and wrinkled below the germ: the flowers are solitary, and of a milk-white colour. It is a native of Switzerland, flowering in January and February.

It varies with semi-double, and with double flowers.

Culture.—These little elegant plants are increased by planting off-sets from their roots in the places where they are to remain in the latter end of summer, when their leaves begin to decline, or in the beginning of the autumn. The roots should not, however, be removed oftener than every third year.

G A R

They should always be planted in bunches of a great number of bulbs together, in order to make a better show, as when set out singly they have no effect.

They are well adapted to the fronts of borders and clumps, as well as woody and shady plantations, producing a fine effect when in blow.

The single sorts come first into blow.

GARDEN, a portion of ground laid out for the purpose of raising and providing different sorts of plants of both the flowery and esculent kinds, as well as various other vegetable productions and fruits.

It is usually distinguished, from the nature of the produce, into the Flower- and Kitchen-garden; the latter being chiefly destined to the raising of useful culinary roots, plants, and vegetables.

Where the first sort of gardens are necessary, they should be laid out so as to have open sunny sheltered exposures, forming if possible the connections between the ornamented or pleasure-grounds, and the kitchen-gardens, according to the general nature and situation of such grounds, so as to afford the most striking effect and variety.

Their forms may vary in proportion to the distribution of the lands and the particular circumstances of their situations, being made square, circular, oblong, or in any other manner, according to the taste of the proprietor; the parts approaching the ornamented grounds being mostly separated by walks, and the introduction of different sorts of the most curious hardy flowering shrubby plants. The interior parts should have a neat ornamental distribution, so as to produce the most striking variety when the flowers are in blow, and afford the greatest convenience in their cultivation. It was formerly the practice to have them laid out with walks surrounding the outer

boundaries or borders being introduced all round within them, and the inner compartments divided into a variety of narrow straight borders or plain four-feet wide parallel beds, having two-feet wide alleys between; the whole of them being laid in a rounding form, and neatly edged with dwarf box, or some other plant suited to the purpose; and the walks and alleys laid with the finest sand; but at present they are mostly arranged so as to suit the nature of the situation, produce the most ornamental effect, and afford the greatest ease, convenience, and success in the culture of the flowers.

They should contain all the different sorts of hardy curious ornamental flower plants, whether of the bulbous, tuberous, or fibrous rooted kinds.

The second division, or kitchen-garden, must be laid out in different methods, according to the differences in the circumstances of the ground. It is sometimes so managed as to constitute a part of, or communicate with, the pleasure-ground; but where there is sufficient extent of land, it is better to be distinct, or detached from it, and in every case as much concealed from the house as possible. The most convenient distribution is at some distance behind it; but on the sides may answer very well, especially when not too contiguous, or so situated as to interrupt any particular prospect.

In regard to the nature of the situation most proper for the purpose, it should, when convenient, be where there is a gentle declination towards the south or south-east, in order that it may have the full advantage of the morning sun. Mr. Forsyth remarks in his "Treatise on the Culture and Management of Fruit-trees," that "if it be situated in a bottom, the wind will have the less effect upon it; but then the damps and fogs will be very prejudicial to the fruit and other crops;" and that when "situated too high, although it will in a great measure be free from damps and fogs, it will be exposed to the fury of the winds, to the great hurt of the trees, by breaking their branches, and blowing down their blossoms and fruit." It should therefore, in his opinion, "be well sheltered from the north and east to prevent the blighting winds from affecting the trees, and also from the westerly winds, which are very hurtful in the spring or summer months." Where it is not "naturally sheltered with gentle rising hills, which are the best shelter of any, plantations of forest-trees should," he says, "be made at proper distances, so as not to shade it." These, he supposes, will be found the best substitute, but at the same time the sun and air should be freely admitted. On this account it is supposed that "a place sur-

rounded by woods is a very improper situation for a garden or orchard, as a foul stagnant air is very unfavourable to vegetation." It is likewise added that "blights are much more frequent in such situations than in those that are more open and exposed." In these sheltering plantations, Mr. Forsyth advises that fruit-trees should be intermixed with those of the forest kind, which, besides being advantageous in the way of affording shelter, ornament, and fruit, become nurseries for raising forest-trees.

But where the situations will not admit of this, he suggests the propriety of planting some cross rows of fruit-trees in the garden at the distances of about forty or seventy yards from each other, more or less, in proportion to the extent: where the length is considerable, one row may be sufficient on each side, but in short cross rows two on each side the walks or paths. In this intention the trees should not be planted opposite one another, but in such a manner as that those in one row may be opposite to the middle parts of the open spaces in the others. In this method, besides the ornamental effect that is produced, the force of violent winds is broken, and much damage to other trees prevented.

In this view, the best sort of trees, according to Mr. Forsyth, is that of dwarfs, with stems about two feet high, which may readily be provided by removing the lower branches.

In fixing upon ground for a garden, it is likewise a point of much importance to have the natural soil of a good quality, being sufficiently dry, mellow, and capable of being easily wrought in all seasons, as well as of a good depth, as from a foot and half to three feet. And if the surface be uneven, it will be the better, as there will be a greater variety in the quality, and of course it will be more fully adapted to the culture of different crops. The most proper sort of soil for this purpose is that of the rich friable loamy kind, and the worst those of the very light, sandy, and stiff clayey descriptions. But the properties of soils may be much improved in most cases by a judicious application of different sorts of materials in the way of manure. See SOIL and MANURE.

Where fruit-trees, especially those of the finer, as well as apple and pear kinds, are to be planted, a greater depth of good soil, as well as a greater degree of dryness, is necessary.

There are very different opinions in respect to the most proper and advantageous forms for this sort of culture; but though much must constantly depend on the nature of the situation, where the spade is to be made use of in performing the work, the square shape, or that which

approaches nearest to it, is probably the most convenient. In other cases, especially where the principal part of the work is, from the difficulty of procuring labourers, and the increasing expense of them, to be executed by the plough, the oblong and circular forms may be the most suitable, as they may be wrought with greater facility and convenience.

The size of kitchen-gardens should always be fully sufficient for the extent of the family, varying from half an acre, to four, five, or more, within the fence. The first quantity, where there are wall and espalier trees, will furnish sufficient employment for one man, and afford due supplies of vegetables and fruit for families consisting of a dozen or more persons. But much in these respects depends upon proper care and management.

The best mode of inclosing garden-ground is by means of brick walls, where that sort of material can be easily procured, and expense is not an object. But oak paling fences answer the purpose very well. These fences, whether made of brick or wood, should be eight, ten, or twelve feet in height. When the extent of walling is sufficient, Mr. Forsyth thinks ten feet walls better than such as are higher, as being more convenient for various purposes. He also advises that they should have borders or slips on the outsides of them, of from forty to sixty feet or more in breadth, where the ground can be spared, which should likewise be inclosed by an oak paling, six or eight feet in height, having a chevaux de frise at the top to strengthen the fence and render the garden more secure. The latter may be conveniently formed, he says, by planing a piece of wood four inches in breadth, and an inch and quarter in thickness, into the shape of the roof of a low pitched house on the upper side, then drawing a line on each side from end to end, at the distance of about an inch and quarter from the upper edge, driving twelve-penny nails through them in regular rows, at the distance of four inches from each other, so as to come out near the upper edge of the contrary side; each being opposite the middle of the space between two nails on the other side. The nail heads should be sunk, and strips of wood nailed over them, tenter-hooks being driven in between the nail points, and the whole nailed fast to the outside top of the fence; continuing pieces in this way till the whole is completed.

By means of these inclosed borders or slips on the outside of the garden walls, Mr. Forsyth thinks there will be plenty of ground for gooseberries, currants, and strawberries, and both sides of the walls may be planted with trees,

by which there will be a considerable increase of wall-fruit. And where there are parts of such slips lying near to the stables, sufficiently sheltered and exposed to the sun, they may be converted to the purpose of a forcing ground for raising melons, cucumbers, and other similar kinds of fruit.

The advantages of this are, that there will be no litter carried within the walls, to dirty the walks; the beds will be concealed from the sight, and much time and labour saved in carting and wheeling the dung.

Where there are not these sorts of slips, the forcing-grounds for melons, cucumbers, &c. should be made in situations that are warm, and open to the full influence of the sun, being well inclosed, and as contiguous to the stable as the nature of the situation will allow.

The great objection to having slips or borders on the outsides of the walls of gardens is that of the vast expense of erecting two fences, where one is capable of answering the purpose, and by proper attention in the distribution of the internal parts, with perhaps nearly equal advantage.

In the distribution of the quarters or parts of the garden, attention should be had to the nature, form, and extent of the ground, so as that they may be laid out in the best manner, in respect to the convenience of managing them, exposure, and size; but they should never be made too small, as there will be much loss of ground by the walks which are essentially necessary in their cultivation. With regard to their form, it may vary according to circumstances, or the taste of the proprietor; but the most convenient and economical one, in respect to ground, is the square, where the garden has been laid out in that manner.

It is usual to have borders round the whole of the inclosing fences, whether they be constructed of brick, stone, or timber; and when there are cross walls, they are likewise generally introduced on the sides of them. The breadths of these should be proportioned to the height of the walls or palings, and the extent of the garden, as from six, to eight, ten, and twenty feet, especially those which have a southern aspect, and are intended for the reception of fruit-trees, as their roots will have more room to extend themselves and procure due nourishment. Besides, wide borders are the most advantageous and economical in the culture of different vegetable crops.

When the gardens are large, other borders may be carried along on the sides of the walks, between them and the espalier or standard fruit-trees; but in other cases this is inconvenient, as taking up too much of the quarters. These

should not exceed six or eight feet in breadth.

In some cases it is the practice to have the edges of the border made firm and even, and planted with dwarf box, or some other plant made use of for the purpose; but as these sorts of edgings are very liable to be destroyed in different places by wheeling over them, and by that means become unsightly, it is probably a better method to only have the edges of the border made up firm and even, close to the gravel of the walks.

There should be a walk introduced on the sides of the borders all round, and likewise in the middle, where the ground is of considerable extent. Cross walks are also necessary where the garden has a great length. But as walks take up much ground, there should be as few as possible. Those on the sides of the borders need not have more breadth than from four to six feet; but the middle ones should be seven feet wide, in order that a cart may be admitted when necessary.

It is also necessary to have walks about two feet or two feet and a half wide, and the same distance from the walls, where there are wall-trees, for the convenience of pruning, training, and nailing, as well as that of gathering the fruit, and admitting a barrow or garden-engine for watering them.

And besides these permanent walks, when the gardens are of much extent, trodden path-walks will be requisite in different parts, for the convenience of cultivation, and as divisions between the crops.

All the first sort of walks should be laid out in a regular manner, and be firmly made up with brick rubbish, stone-masons' chippings, or some other coarse material, and neatly gravelled over. For this last purpose binding-sand answers extremely well, also good clean sifted road drift, as they may be readily kept clean by the hoe and rake; but sea-coal ashes are preferred by some, as being still more dry and firm, more easily kept in order, and cleaner to walk upon in thaws, as well as useful, while new and rough, in preventing slugs from travelling over them from the different quarters.

The narrow walks on the back sides of the borders, near the fruit-trees, need not be laid with any sort of coarse rubbish, being merely covered over to the depth of a few inches with sand or sea-coal ashes; as by this means the ground may be occasionally dug up, and the paths relaid.

Whatever sort of material is made use of in forming the walks, it should be spread in a neat even manner, so as to leave them in a re-

gular moderate convex or rounded form, by which the water will be readily carried off to the sides, and the walks kept perfectly dry. After the surface material has been thus applied, and evenly raked over, it should be firmly rolled down by a heavy iron roller, and occasionally repeated after being well moistened with rain.

Sometimes walks are laid with turf or sward; but this is a very improper material, as being troublesome to keep in order, and soon rendered disagreeable to the sight by being wheeled and trampled upon.

In building the walls of kitchen-gardens, when the height is considerable, the foundation should be from two to two bricks and a half in thickness, and the offset not more than one brick above the height of the level of the border, being then brought to a brick and half in thickness: when they are extensive they should be strengthened and supported by piers at the distance of from forty to sixty feet, according to their height. The projection of these piers should not be more than about half a brick before the surface of the wall. Walls for fruit-trees should always, if possible, be built of brick, as stone is found not by any means so favourable to the maturation of the fruit, and far more inconvenient in the nailing of the trees. The manner of constructing hot-walls for bringing fruit forward by artificial heat will be described hereafter. See **HOT-WALL**.

Some advise projecting copings of stone or wood to be fixed upon the tops of the walls; and the author of the "Philosophy of Gardening" conceives that they may be of great utility in the early vernal months in preventing the tender young shoots of fruit-trees from being destroyed by frost, as, from their being less imbued with the night-dews in consequence of them, they will be less exposed to danger from that cause; it being well ascertained that the fine shoots of vegetables are most exposed to the destruction of frost when in a moist state.

Mr. Forsyth does not however approve of such fixed copings, especially when they project so far as is usually the case; moveable wooden ones fastened by iron hooks to pieces of wood built into the tops of the walls being in his opinion preferable. Besides, they are useful to fix nettings, &c. to in the early spring for protecting the trees with. When fixed copings are adopted, they should not, he thinks, extend above an inch on each side the wall, as the slight projection will be sufficient to preserve it, and at the same time not prevent the dews and rains from falling upon the upper parts of the trees, by which they are greatly benefited. Copings are sometimes formed of a sort of

brick, made convex on the side which is upwards; but these are expensive. A sort of slate, brought from Wales, has lately been made use of for this purpose, which seems to answer very well. It is made to have the projection just mentioned. This sort of coping has been employed in the extensive gardens at Ashted Park, near Epsom; and may be had of different sizes at Mr. Samuel Wyatt's slate-wharf, near Blackfriar's Bridge. Mr. Forsyth suggests that common copings should have a little slope given them "towards the north or east, according to the aspect of the wall," by which the wet from the south and west sides may be taken away, and the danger of the early blossoms and fruit being injured on the south and west walls in cold nights be avoided.

When the soil of a garden is naturally of a stiff quality and retentive of moisture, proper under-draining will be essentially necessary in order to the production of good well-tasted fruit, as well as fine culinary vegetables. In these cases the main or leading drains should be made under the walks, and those from the quarters be formed to communicate with, and empty themselves into them. They should be constructed of bricks, either common or such as are formed for the purpose, and be laid in such directions as are the best adapted to the removal of the injurious wetness, and always of such depths as to prevent their being injured by the spade in working the ground. By this means the soil will be kept in a suitable state for the growth of the plants, and the walks preserved in a fine state of dryness, so as to be sufficiently firm for carting or wheeling upon, even in wet seasons.

When the ground destined for the purpose of forcing is on a level considerably lower than that of the garden, the water from the latter may be made to supply the former, by having the main leading drain terminating in a tank, pond or cistern constructed in it for the purpose, which in many situations may be extremely convenient and useful.

In many cases, and especially where the garden-grounds are of a dry quality, it is of vast advantage to have them situated contiguous to rivers, brooks, or large basons of water, from which they can be supplied by means of drains, pipes, or other contrivances, in the most hot and droughty seasons.

Where no supplies of water can be provided and brought to the garden in these ways, Mr. Forsyth suggests that where they lie on the sides of public or other roads, and the level of the grounds is suitable, hollow drains should be formed in the most convenient parts, to receive the water that washes them in rainy seasons,

and convey it to large ponds or other places made for its reception in the highest part of the garden-ground that will admit of it; from which it may be dispersed to the different quarters which will allow of it, by pipes, with cocks fixed at different places for turning it on as may be necessary. Or by having suitable channels cut, it may be turned upon different parts, as in the practice of watering meadow land, which, where the roads are repaired with calcareous materials, or there is much vegetable matter washed down them, may be highly beneficial in the way of manure. A proper ready exit for the superabundant water must always be provided in these cases, to prevent stagnation. And where the ground has been much enriched by stable manure, the practice should be cautiously adopted, as more may be conveyed away in the state of solution than is brought by the water. The most convenient time for turning on water is generally during the night, which in dry seasons is the most advantageous to the plants or crops.

The expense in pipes, drains, channels, and other apparatus for these purposes, will be considerable at first; but the saving in labour and time in the pumping and carrying water, it is conceived, will soon repay it. Where water is under the necessity of being pumped up from deep wells, large basons or reservoirs should be provided, in which it should remain some time exposed to the influence of the atmosphere before it is made use of in the above or any other way.

When garden-grounds are of a wet spewy quality, Mr. Forsyth recommends basons to be formed in the most convenient parts, for the reception of the water that proceeds from the drains, and which falls in rain on the walks and paths.

In new kitchen-garden grounds, where the soil is of a strong stiff heavy quality, they should be ploughed or trenched over three or four times, being exposed to the effects of frost, in pretty high ridges, for a winter, in order to bring them into a proper condition, before the crops are put in. A crop of potatoes or beans also assists greatly in bringing them into a proper state of pulverization for being planted upon with culinary vegetables.

When the land is become sufficiently broken down and reduced, the wall- and other trees, as well as different sorts of vegetable crops, may be put in. Some, however, put the fruit-trees in before this has been accomplished; but it is not a good practice, as they are liable to be injured by the digging which afterwards becomes necessary in preparing the soil.

In planting wall-trees they should be set at

different distances according to the kinds : those of the peach, nectarine, apricot, plum, and cherry descriptions, at fifteen, eighteen, or more feet, and for figs and pears twenty are seldom too much, suitable aspects being chosen according to the kinds. Between their wall-fruit trees, some at first introduce half or full standards, that the walls may at once be covered, removing them afterwards. But this is a method that should never be attempted when it can be avoided.

Trees of the espalier kind are likewise frequently introduced in ranges round the main quarters at the distance of about six feet from the side of the walk, and from fifteen to twenty in the rows, according to the sorts that are made use of. Within these ranges of espalier trees, good standards of tall growth are occasionally introduced at the distance of thirty, forty, or more feet in each direction. Where there are orchards, this should, however, always be avoided. See the **CULTURE OF THE DIFFERENT KINDS**.

Fruit-trees of the small shrubby kinds, such as gooseberries, currants, raspberries, &c., where there are not out-slips, are frequently introduced on the sides of the quarters, and as divisions to them when large, at the distance of eight or nine feet from each other. When planted in this way, they should be trained in the fan form. But it is better, where it can be done, to have them in separate plantations, especially the first sort. See the **CULTURE OF THE SEVERAL SORTS**.

In respect to the distribution of the vegetable crops, it must be regulated by the nature of the situation, their particular kinds, as well as the taste and experience of the gardener. On the narrow borders under the wall-trees, various sorts of small crops may be grown, both of the early and late kinds, according to the difference of the aspects; but all the deep rooting sorts should be avoided, such as cabbages, cauliflowers, beans, and peas, except those of the frame kind, as being injurious to the trees by the shade which they cause, as well as by depriving them of due nourishment.

But the large part of the borders next the walks is proper for raising all sorts of the more early crops, such as those of the radish, lettuce, spinach, carrots, French bean, salad herb, and all the dwarf pea kinds that are cultivated in wide rows; those which have a southern aspect for the earliest crops; and the eastern and western ones for succession crops of the several kinds; and the northern ones, as being more cool, for raising and pricking out many sorts of small plants, slips, and cuttings, in the

summer season, when the other parts are apt to be too dry.

Such borders as are next to the ranges of espalier trees, are well suited to the different low growing crops, such as lettuce, spinach, endive, strawberries, &c. and for pricking out upon, at different seasons, many sorts of plants to be afterwards transplanted into different situations.

The quarters or large divisions should always be destined for the reception of the large principal crops, such as those of the onion, leek, carrot, parsnip, turnip, beet, potatoe, cabbage, cauliflower, brocoli, colewort, kale, pea, bean, scarlet-bean, clery, artichoke, asparagus, and other similar kinds.

The preparation of the ground, the methods of manuring, and putting in the crops, with their modes of after-culture and management, are fully explained under their respective genera.

In every department the greatest attention should be paid to the keeping of the different parts fully cropped, as well as to neatness and regular order; and as the crops are removed from the ground in the autumn, it is often of great advantage to have it ridged up for the winter.

When the garden has been thus laid out, planted, and finished, Mr. Forsyth has found much advantage from having a plan of it, with the names of the different trees introduced in their proper places. By this means the memory is greatly assisted, especially in extensive grounds, and the various operations performed with more regularity and exactness. The annexed plate contains the **PLAN OF AN IMPROVED GARDEN**.

GARDEN ENGINE, a sort of pump, contrived for the purpose of watering different sorts of wall or other trees. See **WATERING-ENGINE**.

GARDEN FRAME. See **FORCING-FRAME** and **FRAME**.

GARDEN IMPLEMENTS, various sorts of tools made use of in the business of practical gardening. See **PLATE ON GARDEN IMPLEMENTS**.

GARDEN ROLLER. See **ROLLER**.

GARCINIA, a genus containing a plant of the tender exotic tree kind for the stove.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a four-leaved perianthium: leaflets roundish, concave, obtuse, spreading, permanent: the corolla has four roundish petals, concave, spreading, a little larger than the calyx: the stamina consist of sixteen filaments (twelve or more), upright,

placed in a cylinder, simple, shorter than the calyx: the anthers roundish: the pistillum is a superior germ, suboval: style scarcely any; stigma flat, spreading, peltate, eight-cleft, obtuse, permanent: the pericarpium is a coriaceous berry, globular, large, one-celled, crowned with the stigma: the seeds eight, convex on one side, angular on the other, villose, and fleshy.

The species cultivated is *G. Mangostana*, Mangostan or Mangosteen.

It rises in its native situation with an upright stem near twenty feet high, sending out many branches on every side, which are placed opposite, and stand oblique to each other, and not at right angles; the bark of the branches is smooth, of a gray colour; but on the tender shoots it is green, and that of the trunk is of a darker colour, and full of cracks: the leaves are entire; they are seven or eight inches long, and about half as much in breadth in the middle, gradually diminishing to both ends, of a lucid green on their upper side, and of an olive colour on the under, having a prominent midrib through the middle, with several small veins running from that to both sides of the leaf. The flower is like that of a single rose, composed of four roundish petals, which are thick at their base, but thinner towards their ends, and of a dark red colour. The fruit is round, the size of a middling orange, the top being covered by a cap. It has a delicious flavour, partaking of the strawberry and grape; being esteemed one of the richest fruits in the world. It is a native of the Mokuca Islands.

Culture.—These plants are increased by sowing the seeds in pots filled with light mould, in the situations where they grow naturally, being afterwards brought hither, and when the plants are of sufficient growth removed into separate pots, and plunged in the bark-bed of the stove, due shade being given till they become well established. They should afterwards be managed in the same way as tender exotics.

They are also capable of being increased by planting cuttings of the young shoots in pots of light earth, and plunging them in the bark-bed.

The plants afford variety in stove collections.

GARDENIA, a genus containing a plant of the flowering shrubby kind for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Contortæ*.

The characters are: that the calyx is a one-leaved five-cleft perianthium, superior: divisions upright, permanent: the corolla is one-petalled, funnel-form, or salver-form: tube cy-

lindric, longer than the calyx: border flat, five-parted: the stamina have no filaments: anthers five, inserted into the mouth of the tube, linear, streaked, half the length of the border: the pistillum is an inferior germ: style filiform or club-shaped: stigma standing out, ovate, obtuse, two-lobed, often furrowed: the pericarpium is a berry (berry-drupe), dry, one-, two-, or four-celled: the seeds very many, flattened, imbricate, in rows (two rows in each cell).

The species cultivated are: 1. *G. florida*, Fragrant Gardenia, or Cape Jasmin; 2. *G. aculeata*, Round-leaved Gardenia.

The first has a large and woody stem, sending out many branches, which are first green, but afterwards the bark becomes gray and smooth; the branches come out by pairs opposite, and have short joints; the leaves also are opposite, close to the branches; they are five inches long, and two inches and a half broad in the middle, lessening to both ends, terminating in a point; they are of a lucid green, having several transverse veins from the midrib to the borders; they are entire, and of a thick consistence. The flowers are produced at the ends of the branches, sitting close to the leaves. When fully blown, the double flower is as large as a middling rose. It has a very agreeable odour on the first approach, something like that of the orange-flower, but, on being more closely smelt to, like the common double white Narcissus. It is a native of the Cape, flowering in July or August.

It varies with single and double flowers.

The second species is a small shrub rising by a branched stalk, and shooting commonly to the height of seven or eight feet; the main stem tough and hard; the branches somewhat prickly at the ends; the leaves of an oval form, and growing in tufts. It is a native of the West Indies.

Culture.—The first sort may be increased by planting cuttings of the young shoots in pots of light rich mould, in the summer season, plunging them in a moderate tan hot-bed, and covering them close with bell-glasses, giving due shade till they have stricken root. When this has been fully effected, they should be carefully removed into separate small pots, and replunged in the hot-bed. When they are become well established, they should be gradually inured to the influence of the air.

The second sort may be raised by sowing the seeds in pots filled with light fresh earth in the early spring months, plunging them in a bark hot-bed, frequent slight waterings being given. After the plants come up they should have free air in fine weather, and be often watered. When of some growth they should be carefully re-

moved into separate pots, and be replaced in the hot-bed, due shade being given till they are re-established, when they must have air and water in proportion to the warmth of the season. As the autumn approaches they should be removed into the bark-bed of the stove, where they are best kept the two first seasons; but they may afterwards be exposed in the open air in the hot summer months.

These plants are valuable for the variety which they afford in stove collections.

GARLICK. See ALLIUM.

GARLICK-PEAR. See CRATEVA.

GELDER ROSE. See VIBURNUM.

GENISTA, a genus containing plants of the low shrubby deciduous and evergreen kinds.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, small, tubular, two-lipped: upper lip two-toothed, more deeply divided; lower three-toothed, nearly equal: the corolla is papilionaceous: banner oblong, remote from the keel, the whole reflex: wings oblong, loose, shorter than the others: keel straight, emarginate, longer than the banner: the stamina have ten filaments, connate, emerging from the keel: anthers simple: the pistillum is an oblong germ: style simple, rising: stigma sharp, rolled in: the pericarpium is a roundish legume, turgid, one-celled, two-valved: the seeds solitary, usually kidney-form.

The species chiefly cultivated are: 1. *G. tinctoria*, Common Dyer's Genista, or Broom; 2. *G. sagittalis*, Jointed Genista, or Broom; 3. *G. florida*, Spanish Dyer's Genista, or Broom; 4. *G. pilosa*, Hairy Genista, or Broom; 5. *G. Anglica*, English Genista, Petty-white, or Needle-Furze; 6. *G. candicans*, Hoary Genista, or Montpellier Cytisus; 7. *G. Canariensis*, Canary Genista, or Cytisus.

In the first the roots creep far and wide. The stems are many, angular, tough, from a foot to eighteen inches or two feet in height, sometimes more; the branches subdivided, ending in short spikes of yellow flowers, with stipules between them. The leaves alternate, sessile, quite entire, acuminate, an inch long, and two lines broad, smooth, except that the edges and the nerve underneath are slightly villose. It is a native of most parts of Europe.

The second species sends out several stalks, which spread flat on the ground, and divide into many flat branches which are jointed, and their two sides are edged like a broad-sword; they are herbaceous but perennial. At each of the joints is placed one small sessile spear-

shaped leaf, ending in a point, of a deep-green colour and smooth. The flowers are produced in close spikes at the ends of the branches, and succeeded by short hairy pods, which contain three or four kidney-shaped seeds. It is a native of France.

The third rises with woody stalks two or three feet high, sending out many taper channelled branches, which grow erect. The leaves are small, alternate. The spikes of flowers terminating; succeeded by short pods, which turn black when ripe, and contain four or five kidney-shaped seeds. It is a native of Spain, flowering in June and July.

The fourth species differs from the first in having the branches depressed on every side and procumbent, while that is upright. The root is long, running obliquely, and furnished with many small fibres. The stem a foot in length or more, much branched, and tough; the old branches naked, the young ones clothed with numerous, minute, oval or oval-lanceolate leaves, entire, smooth on the upper surface, beneath covered with long white silky hairs. The flowers are in short spikes on the summit of the branches, on short hairy peduncles. It is a native of Sweden, flowering in May.

The fifth has the stem much branched: the branches tough, without leaves, furnished with extremely sharp slender thorns, from a quarter to half an inch in length; the shoots of the year grow in bundles on the summits of the old ones, and sparingly from the sides, bearing numerous, small, light green, oval or lanceolate, smooth, entire leaves, intermixed with soft spines. The flowers are small, pale yellow, and few. It is a native of Britain.

The sixth species rises to the height of seven or eight feet, sending out many slender branches, the upper parts of which, for more than a foot in length, send out small flowering-branches on their sides, supporting five yellow flowers, which appear in June and July. It is a native of Spain.

The seventh has the leaves obovate, somewhat mucronate; but the floral leaves subsessile and minute. The calyx is trifid, the lowest segment three-toothed. The flowers are in corymbs, five or six together, and sweet-scented. It is a native of the Canaries.

Culture.—The first six hardy sorts are all capable of being raised by sowing the seeds in beds of common earth, or, which is better, in the places where they are to remain, in the early autumn or spring; but the former is the more advantageous, as much time will be saved. Where raised in beds, the plants must be carefully taken up and removed, when they have

had a twelvemonth's growth, to the places where they are to remain; but in the other method require no other culture, but proper thinning out and being kept clean.

The last sort may be increased by sowing the seeds in pots of good mould in the spring, plunging them in a moderate hot-bed. When the plants have attained a few inches in growth, they should be removed into separate pots, and be replunged in the hot-bed. They afterwards require the same sort of management as other less tender green-house plants.

All the first sorts are well adapted to the fronts and other parts of clumps and borders in ornamented grounds, by their flowery nature; and the last affords a fine effect in the green-house by its evergreen property.

GENTIAN. See GENTIANA.

GENTIANA, a genus of plants of the hardy herbaceous perennial flowery kind.

It belongs to the class and order *Petandria Digynia*, and ranks in the natural order of *Rotaceæ*.

The characters are: that the calyx is a five-parted perianthium, sharp: divisions oblong, permanent: the corolla has one petal, tubular at bottom, imperforate, at top five-cleft, flat, withering, various in form: the stamina have five filaments, subulate, shorter than the corolla: anther simple: the pistillum is an oblong germ, cylindric, length of the stamens: styles none: stigmas two, ovate: (germ superior; style simple, or two sessile stigmas:) the pericarpium is an oblong capsule, columnar, acuminate, slightly bifid at the tip, one-celled; two-valved: the seeds numerous, small, fixed all round to the walls of the capsule: receptacles two, each fastened longitudinally to a valve.

The species cultivated are: 1. *G. lutea*, Yellow Gentian; 2. *G. punctata*, Spotted-flowered Gentian; 3. *G. asclepiadea*, Swallow-wort-leaved Gentian; 4. *G. acaulis*, Dwarf Gentian, or Gentianella.

The first has a thick root, of a yellowish brown colour, and very bitter taste: the lower leaves are petioled, oblong-ovate, a little pointed, stiff, yellowish green, having five large veins on the back, and plaited: the stem three or four feet high or more, with a pair of leaves at each joint, sessile or almost embracing, of the same form with the lower ones, but diminishing gradually to the top: the flowers are in whorls at the upper joints. It is a native of Switzerland, flowering in June and July.

The second species has the leaves ovate, elongated, and strict: the calyxes shallow, and in form of a basin, the calycine teeth narrow, sharp, and not very leafy: the corolla is of a

papery substance, extremely thin, of a dull and very pale greenish straw-colour, with very minute dots thickly and irregularly scattered over it: the segments of the border commonly seven, sometimes eight, but very seldom six, always shorter, narrower, contiguous, rounded, blunt, without any auricles at the base; and finally the bellying of the corolla is blunter and almost the same over the whole bell. It is a native of Austria.

The third has the stem upright near a foot high: the leaves smooth, about two inches long, and three quarters of an inch broad at the base, embracing there, and ending in an acute point; they are of a fine green, have five longitudinal veins, joining at both ends, but diverging in the middle, and diminish in size as they are nearer the top: the flowers are in pairs opposite, on short peduncles; pretty large, bell-shaped, and of a fine blue colour. It is a native of Switzerland, flowering in July and August.

The fourth species has a large woody branched root: a set of ovate-lanceolate leaves spreads on the surface: the stem from one to three inches in height, with one or two pairs of leaves on it, and terminated by one very large, upright, handsome flower (in the garden, when the plants are strong, there are sometimes more,) which is of a deep azure blue, dotted on the inside. It is a native of Austria.

Culture.—The three first sorts are easily raised, by sowing the seed in pots soon after it is ripe, as when kept till the spring it will not succeed: the pots should be placed in a shady situation, and kept clean from weeds. Some advise their being sown where they are to remain, but the first is probably the best method. In the spring the plants appear, when they must be duly watered in dry weather, and kept clean from weeds till the following autumn; then be carefully shaken out of the pots, so as not to break or injure their roots; and a shady border of loamy earth should be well dug and prepared to receive them, into which they should be put at about six inches distance each way, the tops of the roots being kept a little below the surface of the ground, and the earth pressed close to the roots. If the following spring prove dry, they should be duly watered, to forward their growth. The plants may remain here two years, by which time they will be fit to transplant where they are designed to grow, removing them in the autumn, as soon as their leaves decay, great care being taken in digging them up, not to cut or break their roots, as that greatly weakens them. They require afterwards no other culture, but to dig the ground about them early in the spring before they begin to shoot, and in the summer to keep

them clean from weeds. The roots continue many years, but the stalks decay every autumn; the same roots not flowering two years together, or seldom oftener than every third. When they flower strong, they have, however, a fine appearance.

The first is mostly propagated by off-sets or parting the roots, and planting them where they are to remain in the early autumn; but in order to have the plants flower well, they must not be often transplanted or parted.

They are also capable of being raised from seeds managed as the first sorts.

They all succeed the most perfectly in moist loamy soils, where there is a degree of shade.

All the sorts are useful as ornamental plants, for the various clumps, borders, and quarters of pleasure-grounds; those of low growth being planted towards the fronts, and the latter kinds more backward.

GERANIUM, a genus containing plants of the herbaceous perennial kinds.

It belongs to the class and order *Monadelphia Decandria*, and ranks in the natural order of *Grinales*.

The characters are: that the calyx is five-leaved: leaflets ovate, acute, concave, permanent: the corolla has five petals, obcordate or ovate, spreading, regular: nectary five honeyed glands, fastened to the base of the longer filaments: the stamina consist of ten filaments, awl-shaped, connected slightly at the base, spreading at top, shorter than the corolla: anthers oblong, versatile: the pistillum is a five-cornered germ, beaked: style awl-shaped, longer than the stamens, permanent: stigmas five, reflex: the pericarpium is a five-grained capsule, beaked, the cells opening inwards, each having a simple naked tail fixed to it: seeds solitary, and ovate-oblong.

This extensive genus has been subdivided into *Erodium* with five, and *Pelargonium* with seven fertile stamens.

The species are: 1. *G. phaeum*, Dark-flowered Crane's-Bill; 2. *G. nodosum*, Knotty Crane's-Bill; 3. *G. striatum*, Streaked Crane's-Bill; 4. *G. Sibericum*, Siberian Crane's-Bill; 5. *G. sanguineum*, Bloody Crane's-Bill; 6. *G. macrorhizum*, Long-rooted Crane's-Bill.

Other species may be cultivated.

The first has upright stems nearly cylindrical, from eighteen inches to two and even three feet in height, below woolly, and having a few long shining hairs on them; joints large, commonly tinged with red: the leaves are soft, the younger ones silky, ribbed; the lower on long petioles in pairs, the upper solitary; lobes mostly five, unequally toothed, the lateral ones lobed: the lower leaves have frequently six or seven lobes, and the uppermost only three or four. The flowers are of a

blackish purple colour. It is a native of Switzerland, &c.

The second species is herbaceous, with smooth shining stems, swelled at the joints, having knobs like little bulbs at the origin of the branches and peduncles; whence the name: the flower-leaves are petioled, three-lobed, ovate-acuminate, serrate; the upper ones smaller, subsessile, the middle segment larger than the others. The flowers are of a purple colour. It is a native of Dauphiné, flowering in July and August.

The third has a perennial root, sending up many branching stalks a foot and half high: the leaves are light green; those on the lower part of the stalk have five lobes, and stand upon long foot-stalks; those on the upper part have but three lobes, sit closer to the stalks, and are sharply indented on the edges; they are gashed, and have a ferruginous or purplish brown spot at their base: the peduncles are long and slender: the petals obtuse, deeply indented at top, of a dull white, finely reticulated with many purple veins. It is a native of Italy, flowering in May and June.

The fourth species has also a perennial root: the stems are herbaceous, annual, diffusely dichotomous, jointed, almost round and smooth. At the divisions on each side is a lanceolate acuminate stipule: the leaves are opposite, five-parted, divided into unequally pinnatifid acute segments: the peduncles are longer than the leaves, from the axils, with two bractes at top: the calycine leaflets somewhat hirsute, with short awns: the petals are pale purplish, without any streaks, scarcely longer than the calyx, either quite entire or slightly emarginate. It is a native of Siberia, flowering in June.

The fifth has a perennial, somewhat woody root: the whole plant is set with white spreading hairs: the stems a foot or more in height, lax, spreading, branched, round, jointed, swelling at the joints: the leaves opposite, deeply lobed and cut, sometimes seven-parted, the segments linear, the upper surface rough, the lower hairy, the edge also is hairy and entire: the peduncles axillary, much longer than the leaves, hairy, with a joint and two small bractes more than half way down. Calycine leaflets oval, with membranaceous reddish edges, and terminated by a short red awn: the petals are obcordate, very large, pale red, with deeper veins, hairy at the base. The whole plant frequently turns red or purple after flowering. It is a native of many parts of Europe, flowering most part of the summer.

There are varieties, with short spreading stems and smaller leaves and flowers, with larger leaves deeply divided, and with variegated or striped flowers.

The sixth species has a perennial root, the thickness of a finger, becoming woody, dark purple on the outside, round, single, or branched, having many long, round, thickish fibres. Hence springs a bundle of leaves, and several almost upright stems, or rather scapes. These are all very soft and smooth, with a very short close down. Most of the leaves are large subpeltate-seven-parted, on very long petioles; the lobes are oblong, a little narrowed towards the base, serrate-toothed; the edges tinged with pale red; the petiole round, strong, erect; as are also the scapes, which are somewhat higher than the leaves, silky-tomentose, quite simple, leafless, terminating in two peduncles, or else simply two-flowered: the flowers are large, elegant, deep red, or bright purple; and the whole plant, when rubbed, emits an agreeable odour. It is a native of Italy, flowering in May and June.

Culture.—All these plants may be increased either by sowing the seeds or parting the roots. In the first method the seeds should be sown in the autumn as soon as they are become perfectly ripe, either in pots, or a shady border, where the soil is light and fine. When the plants have a few inches growth, they may either be pricked out into other pots or beds at five or six inches distance, or be suffered to remain till the following autumn or spring, when they may be removed into other pots, or be set out where they are to remain, being occasionally supplied with water.

In the second method, the roots should not be too much divided, and be planted in the early part of the autumn, where the plants are to remain.

They are most of them of hardy growth, succeeding in most sorts of soils, requiring little culture, except that of being kept clean from weeds.

They are all proper for affording variety in the borders and other parts of ornamented grounds, and the potted sorts in collections about the house.

GEUM, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Icosandria Polygynia*, and ranks in the natural order of *Senticosæ*.

The characters are: that the calyx is a one-leaved perianthium, ten-cleft, uprightish: segments alternately very small, sharp: the corolla has five petals, rounded: claws the length of the calyx, narrow, inserted into the calyx: the stamina have numerous filaments, subulate, length of the calyx, into which they are inserted: anthers short, broadish, blunt: the pistillum has numerous germs, collected into a head: styles inserted into the side of the germ, (terminating)

hairy, long: stigmas simple: there is no pericarpium: common receptacle of the seeds oblong, (columnar,) hirsute, placed on the reflex calyx: the seeds numerous, compressed, hispid, awned, with a long style.

The species are: 1. *G. Virginianum*, American Avena; 2. *G. montanum*, Mountain Avena; 3. *G. rivale*, Water Avena.

The first has the stem a foot and half or two feet high, branching at top into small peduncles, each terminated by a small white flower. It is a native of North America, flowering in July and August.

In the second species, the root-leaves are in a tuft, on petioles of different lengths; these are hairy, and have several pairs of leaflets on them; the lowest very small, the succeeding ones gradually larger, and the pair immediately under the great terminating leaflet much bigger than any of the rest: the extreme leaflet is two or three inches in length and breadth, obscurely lobed, gash-serrate, and veined: the leaves of the stem sessile, solitary, alternate, trifid: the pinnae smaller and more crowded than in the others, sessile and gash-serrate: the stem is unbranched, from a span to a foot and half in height: the flowers are large, solitary, spreading, upright, of a yellow colour. It is a native of France, flowering in June and July.

There is a variety, with large golden flowers.

The third has a creeping, reddish, astringent, aromatic root, smelling like cloves: the stem a foot high, upright, round and branched, bending at top, but becoming erect as the fruit ripens: the leaves are lyrate, jagged, gash-serrate and hirsute: stipules undivided or jagged: the peduncles purplish, hirsute with hairs terminating in a red globule; becoming less bent as the seeds ripen. It is a native of most countries of Europe; flowering from May till the autumn.

It varies with yellow flowers, and with double flowers.

Culture.—All these plants are capable of being increased, both by seeds and parting the roots.

The seeds should be sown in the early autumn in the situations where the plants are to grow, or in a shady situation, to be removed when of a proper growth.

The partings of the roots may be planted out where the plants are to remain in the early part of the autumn, when the weather is mild, and rather moist.

These plants are hardy, and require little cultivation afterwards.

They afford ornament and variety in the borders and clumps of pleasure-grounds among other flowering plants.

GILLIFLOWER. See DIANTHUS.

GLADIOLUS, a genus comprising plants of the tuberous-rooted flowery perennial kind.

It belongs to the class and order *Triandria Monogynia*, and ranks in the natural order of *Ensateæ*.

The characters are: that the calyx is a spathe, two-valved, inferior, shorter than the corolla: valves oblong, permanent; the outer one larger, inclosing the inner: the corolla is one-petalled, superior: tube cylindric, bent: border somewhat bell-shaped, six-parted; segments oblong, from erect-patulous, the uppermost and lowest lateral either without or within: the stamina have three filaments, inserted into the orifice of the tube, filiform, shorter than the corolla: anthers ovate, incumbent: the pistillum is an inferior germ, triangular: style filiform: stigmas three, rolled back and spreading, blunt, villose: the pericarpium is an ovate capsule, three-cornered, blunt, three-celled, three-valved: the seeds very many and smooth.

The species are: 1 *G. communis*, Common Sword-Lily, or Corn-Flag; 2. *G. imbricatus*, Imbricated-flowered Gladiolus; 3. *G. tristis*, Square-stalked Gladiolus; 4. *G. angustus*, Narrow-leaved Gladiolus; 5. *G. cardinalis*, Superb Scarlet Gladiolus.

The first has a yellowish, round, compressed root covered with a brown furrowed skin; hence spring two sword-shaped leaves, embracing each other at the base, and between them rises the flower-stalk, growing near two feet high, having one or two narrow leaves embracing it like a sheath, and terminated by five or six purple flowers, one above another at some distance, ranged on the same side of the stalk: the spathe covers the flower-bud before it expands, but splits open lengthwise when it opens, and shrivels up to a dry skin, remaining about the seed-vessel till the seeds are ripe.

It is divided by Mr. Miller into three species, as the common sort described above, with the flowers disposed on one side the stalk, varying with white and flesh-coloured flowers, called *Italian Corn-flag*; the Italian, with flowers on each side the stalk, of which there is a variety with white flowers, named *French Corn-flag*; and the Great Corn-flag of Byzantium, which has larger roots, but of the same form; the leaves are much broader and larger, with deeper channels: the flower-stalks rise higher, the flowers are much larger, of a deeper red colour, and the sheaths longer. This is the sort mostly cultivated, which makes a fine appearance when in flower, and the roots do not increase so as to be inconvenient.

Besides these, according to some, there are three other varieties; the Blush, the White, and the Small Purple.

In the second species the leaves are sword-

shaped, and the flowers small, being all directed one way, and imbricate. It is a native of Russia.

In the third come out two or three narrow leaves from the root, a foot and half long, having a longitudinal furrow in the middle, and ending in acute points; they are of a deep green, and stand erect. Between these arises a slender taper stalk, about the same length as the leaves, having one or two short acute-pointed leaves on the lower part, embracing the stalk at their base: the flowers are alternate, distant: the tube of the corolla curved downward, and not so long as in most of the other sorts; segments acute, and nearly equal; pale yellow or sulphur colour. It is a native of the Cape, flowering in the end of May.

The flowers vary much with different shades of white and green, yellow, flesh-coloured, blue, purple and violet. It is commonly said to produce only two flowers on a stem, but there are frequently more, which generally give forth a most agreeable fragrance in their expansion.

The fourth species has a simple scape, or but little branched, sheathed, round, striated, smooth, flexuose-erect, a foot high: the leaves are from long sheaths, ensiform, marked with white elevated streaks, entire, smooth, shorter than the scape; the upper ones gradually smaller; the flowers all on the same side, ascending, on one or two spikes, a hand in length: the rachis angular, flexuose, twisted, smooth: the spathes the length of the tube of the corolla, shorter than the branches, green: the segments of the border of the corolla usually waved.

In the fifth the flowers are fine scarlet, with large white somewhat rhomboidal spots on several of the lowermost divisions of the corolla: strong plants will throw up a stem three or four feet high, dividing at top into several branches. It flowers here in July and August; and is probably a native of the Cape.

Culture.—The first sort and varieties are capable of being readily increased, by planting the off-sets from the old roots in the beginning of the autumn, in the places where the plants are to remain.

The other sorts may likewise be raised in the same way as well as by seeds. These should be planted in a warm border, and be protected in the winter by glasses or some other means, when there is a necessity for it.

When raised from seed it should be sown towards the end of August, in pots filled with light earth, placing them in a shady situation at first, but afterwards where they may be exposed to the sun, being protected during the winter in a hot-bed frame, free air being admitted when the weather is mild. In the spring the pots should be removed to a shady situation, with

only the morning sun. When the stems decay, the roots should be taken up and kept in sand in a dry place, till the time of planting. In the second year's planting, they should be put in separate small pots.

The old roots may be taken up every two or three years, to have the off-sets taken off from them.

They produce a fine effect and variety in the flower borders and other parts among other flowering plants.

GLASS CASE, a light sort of erection formed with glass sashes, in proper frame-work, mostly upright in the front part and ends, but sloping at top from a back wall, or other convenient building, to the fore part; the front, top, and both ends being of glass-work. The situation for this purpose should face the south, in order to have the full influence of the sun. Constructions of this nature are useful for protecting many sorts of curious tenderish plants in winter, which want it only occasionally from severe frost, and other similar causes.

Buildings of this kind may be constructed occasionally, either against some ready-built south wall, which serves for the back, all the other parts forward being wood-work and glass; or detached in a similar situation, so as that the whole front may stand to the south, the back being formed of brick-work, &c. or of wood double planked; but the former is preferable; the whole being generally ranged lengthways, nearly east and west.

The dimensions may be from five or six, to eight or ten feet in width, by ten, fifteen, or twenty feet in length or more, as may be required; and from six or eight, to ten feet high behind, by five or six, to seven or eight in the front, both ends in proportion with the top, sloping gradually, as just noticed, from the back, having an entrance or door in front, or at one end. The glass-work should be made to slide.

Sometimes fire-flues are carried along the back and front internally, proceeding from an external furnace, for occasional fire-heat in winter, which render them more convenient and useful for different purposes.

These Cases, as mentioned above, are used as preservatory departments, in which to winter many sorts of curious exotics, of the hardier green-house kinds, which only want protection from severe cold, as well as many choice kinds of the open ground which are rather tenderish in their minor growth, or any other particular or curious hardy plants, whether flowers, shrubs, or young trees, especially the choice evergreen kinds, which require effectual protection from the ravages of rigorous frosts or cutting winds in winter or early spring; and at the same time, in mild open weather, to

enjoy the full air by opening the glasses; all which, being in pots, can be readily placed in this preservatory at the approach of severe weather, and be thus kept in good condition till settled weather in spring, &c. then removed into the full air: in summer and autumn, when unoccupied in this way, these Cases may be of utility to place some kinds of curious tender plants in when in flower for seeding, to guard them from heavy or incessant rain or cold night dews in autumn, which in many sorts retard, or sometimes wholly frustrate their production of good seed, as in some sorts of curious tender Annuals, particularly the fine Double Balsams, Cock's-Combs, Tricolors, Double Stramoniums, Diamond Ficoides, and various others.

They are also capable of being used in spring and the early part of summer, as April, May, and June, as a kind of drawing-frames, for some particular sorts of curious Annuals, to bring them to a tall growth, such as the Large or Giant Cock's-Combs, Tricolors, Double-Stramoniums, Double-striped Balsams, Egg-plants, &c. the plants being first raised in hot-beds under garden-frames, till of twelve or fifteen inches growth, then a hot-bed made in the Glass-Case, earthed at top, and the plants in pots singly plunged into the earth of it; the glasses in these cases being shut close, only a necessary admission of fresh air being given every day, by which they run up to a tall stature, in the best perfection of strength for flowering. See ANNUAL PLANTS.

These glass cases are also sometimes made use of as a kind of appurtenances to hot-houses or stoves detached from them, having, as observed above, internal flues for fire-heat when necessary, serving as preservatories for many sorts of exotics, which are tenderer than common green-house plants, but do not require the constant full heat of the more tender hot-house kinds, but only the assistance of moderate fire-heat in winter, in cold nights, or when very damp, cloudy, foggy weather and severe frosts prevail. They are sometimes used in the business of forcing different kinds of flowering plants and esculents, either by means of an internal bark-bed, or flues for fire-heat.

When intended for this purpose, it is convenient to have both an internal pit for a bark-bed, and flues for fire-heat, in order to use either separately, or sometimes both, as it may be found necessary.

GLASTONBURY THORN. See *MESPILUS*.

GLEDITSIA, a genus containing a plant of the deciduous tree kind.

It belongs to the class and order *Polygamia Dioecia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the male has a long, compact, cylindric ament: the calyx is a perianthium proper, three-leaved, (three-cleft,) leaflets patulous, small, acute: the corolla has three roundish petals, sessile, patulous, like the calyx: nectary turbinate, with the other parts of the fructification growing to the mouth: the stamina have six filiform filaments, longer than the corolla; anthers incumbent, oblong, compressed, twin: hermaphrodite in the same ament with the males, usually terminating: the calyx is a four-cleft perianthium, otherwise as in the male: the corolla has four petals, otherwise as in the male: nectary as in the male: the stamina as in the males: the pistillum, pericarpium, and seed as in the female: female a lax ament, on a distinct plant: the calyx is a perianthium proper, as in the male, but five-leaved (five-cleft): the corolla has five petals, long, sharp, from upright spreading: nectaries two, short, like filaments: the pistillum is a broad germ, flattened, longer than the corolla: style short, reflex: stigma thick, the length of the style, along which it grows, pubescent at top: the pericarpium is a very large broad legume, extremely flattened, divided by several transverse partitions; and filled with pulp: the seeds solitary, roundish, hard, shining.

The species is *G. triacanthos*, Three-thorned Acacia.

It is a tree common in most parts of North America, where it is known by the name of Honey Locust. It rises with an erect trunk to the height of thirty or forty feet, and is armed with long spines, three or four inches long, which have two or three smaller ones coming out from the side, and are frequently produced in clusters at the knots of the stem. The leaves are bipinnate, composed of ten pairs of leaflets, of a lucid green colour, and sessile. The flowers come out from the side of the young branches, but, being of a herbaceous colour, have little appearance.

In this climate the leaves seldom come out till June, and the flowers not till the end of July; the tree does not produce flowers till it is of a large size.

There are varieties with fewer spines, and the leaves smaller, the pods oval; with but one seed; and with stronger spines.

Culture.—These trees are capable of being increased by sowing the seeds obtained from America, in a bed of light earth in the early spring, water being occasionally given when the weather is dry. But it is a more expeditious practice to sow them in pots, and plunge them in a moderate hot-bed. They should be kept clean during the first summer, and in the win-

ter be protected from sharp frosts, especially those plants that are in pots. In the following spring the young plants may be most of them removed into nursery-rows at a foot or eighteen inches distant, with eight or ten inches in the rows. The small ones that remain may be put out in the following autumn or spring. They should remain in this situation till they have had two or three years growth, when they may be planted where they are to remain any time in the later part of the spring.

They succeed best in light deep soils in sheltered situations.

These are all very ornamental trees, being well suited to plantations and large shrubbery parts, and when planted alone in large openings or lawns kept in grass they produce a fine effect, but have the disadvantage of putting forth their leaves late.

GLOBE-AMARANTH. See *GOMPHRENA*.

GLOBE-FLOWER. See *TROLLIUS*.

GLOBE-THISTLE. See *ECHINOPS*.

GLOBULARIA, a genus comprising plants of the herbaceous flowery perennial kind.

It belongs to the class and order *Tetrandria Monogynia*, and ranks in the natural order of *Aggregatæ*.

The characters are: that the calyx is a common perianthium, imbricate, with scales the length of the disk and equal: proper one-leaved, tubular, five-cleft, sharp, permanent (four- or five-toothed; the teeth bristle-shaped and acuminate): corolla is universal, nearly equal: proper monopetalous, tubular at the base: border five-parted: upper lip very narrow, two-parted, shorter: lower of three larger, equal segments: the stamina have four filaments, simple, the length of the corollule: anthers distinct, incumbent: the pistillum is an ovate superior germ: style simple, the length of the stamens: stigma obtuse: there is no pericarpium: proper calyx converging, inclosing the seed: the seeds are solitary and ovate: the receptacle is common, oblong, separated by chaffs.

The species chiefly cultivated are: 1. *G. Alypum*, Three-tooth-leaved Globularia; 2. *G. vulgaris*, Common Globularia, or Blue Daisy.

There are other species that may be cultivated.

The first has a hard woody stem, about two feet high, with many woody branches, beset with leaves like those of the myrtle. The flowers are produced on the tops of the branches in a ball, and are of a blue colour. It is a native of the south of Europe, flowering from August to November.

This shrub is said to possess a violent purging quality.

The second species has the stem slender, upright, covered with leaves, from an inch and half to six inches in height, and sometimes more, somewhat angular, very simple, smooth, one-flowered. The root-leaves are numerous, like those of the daisy, but thicker, petioled, placed in a ring, ovate, obtuse, quite entire, emarginate, the nerve produced into a small awn or point: the stem-leaves alternate, nearer to sessile, smaller, three-toothed, four lines broad, from an inch to an inch and a half in length, all smooth, and of a bright green. The flowers are in a globular head, and of a blue colour. It is a native of many parts of Europe, flowering in May and June.

It varies with a white flower, and with a leafless stalk or stem.

Culture.—The first species may be increased by planting cuttings of the young branches in April, just before they begin to shoot, in pots of light fresh mould, plunging them in a very moderate hot-bed, giving them due water and shade till they have stricken root. After this they should be removed from the bed, and gradually hardened to the open air. The plants should afterwards be protected during the winter.

The second sort is readily increased by parting the roots as in the Common Daisy, planting them out in the early part of the autumn in moist shady situations. They succeed best in such loamy soils as are rather moist.

These plants are ornamental, the first sort among potted plants, the latter in the fronts of the more moist and shady borders or clumps of pleasure-grounds.

GLORIOSA, a genus containing a plant of the herbaceous flowering perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Sarmentaceæ*.

The characters are: that there is no calyx: the corolla has six petals, oblong-lanceolate, waved, very long, woolly reflex: the stamina have six subulate filaments, shorter than the corolla, from straight patulous: anthers incumbent: the pistillum is a globular germ: style filiform, longer than the stamens, inclined: stigma triple, obtuse: the pericarpium is a superior capsule, oval, three-lobed, three-celled, three-valved: the seeds several, globular, berried, in two rows.

The species is *G. superba*, Superb Lily.

It has a long fleshy root of a whitish colour, and a nauseous bitter taste, from the middle of which arises a round weak stem, requiring support, and with that growing to the height of eight or ten feet. The leaves are smooth, about eight inches long, and one inch and a half

broad at the base, growing narrower till within two inches of the end, which runs out in a narrow point, and ends in a tendril: the flowers are at the upper part of the stem, from the side, on slender peduncles, hanging down, at first of a herbaceous colour, but changing to a beautiful flame-colour. It is a native of Guinea, flowering in June and July. The roots and other parts are poisonous.

Culture.—This plant is capable of being increased by planting the offsets from the old roots, either in the autumn after the stems decay, or in the early spring before they shoot, in pots filled with light earth, plunging them in the bark-bed of the stove. The old roots, when taken out of the ground, should be preserved in dry sand during the winter in the stove, or in a dry warm room. It is the practice of some to let the roots remain during the winter in the mould, keeping the pots in the tan-bed; planting out the offsets early in the spring. In either way they should have very little water.

When the stems appear, they should be supported by sticks, and in hot dry weather a little water be sparingly given, as there may be occasion.

The pots in which they are planted should be small, that they may be confined and put forth stronger stems. Twopenny pots will be large enough for roots of the greatest size.

These plants are highly ornamental on account of their beautiful flowers among others of the stove kind.

GLOXINIA, a genus comprising a plant of the herbaceous flowery perennial kind.

It belongs to the class and order *Didynamia Angiospermia*, and ranks in the natural order of *Personatæ*.

The characters are: that the calyx is a superior perianthium, five-leaved: leaflets equal, lanceolate, serrulate at the tip, the three upper ones nerved, the two lower bent down with the nectary, permanent: the corolla is monopetalous, irregularly campanulate: tube scarcely any: border oblique, five-cleft, segments roundish, the four upper spreading and entire, the lowest straight, concave, toothed: the stamina have four filaments, with the rudiment of a fifth, two scarcely shorter, inserted into the receptacle, fastened to the lower margin of the corolla, sickled, pubescent, converging laterally above: anthers ovate, two-celled, peltate, united within the opening of the corolla: the pistillum is an inferior germ, turbinate, striated: style filiform, the length of the stamens: stigma capitate, the length of the anthers: the pericarpium is a one-celled capsule (or half-celled): receptacles two, opposite, two-parted, fastened to

the sides of the capsule by the partition: the seeds very numerous, inserted into the receptacles.

The species is *G. maculata*, Spotted Gloxinia.

It has a perennial thick fleshy root, divided into knots, which are scaly. The stems are several, about a foot high, thick, succulent, and purplish. The leaves are oblong, thick, sessile, serrate, rough on their upper side, where they are of a dark green, but their under side is purplish. The stems are terminated by short spikes of blue flowers; or rather an erect raceme, leafy or bracted; in which the flowers are axillary, solitary, peduncled, bright blue, and sweet-scented. It is a native of South America.

Culture.—These plants may be readily increased by planting the divided roots in the early spring, in middle-sized pots, filled with good mould, which must be plunged into a fresh tan-bed. After the plants are up they must be often refreshed with a little water, and when the weather is hot have air freely admitted.

They may also be raised from cuttings of the young shoots, planted and managed in the same way in the summer season.

They must be constantly kept in the stove in an open situation, and never transplanted when in leaf, as by that means they are prevented from flowering.

They afford variety in collections of the stove kind.

GLYCINE, a genus containing plants of the shrubby climbing kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved, compressed perianthium: mouth two-lipped: upper lip emarginate, obtuse: lower longer, trifid, acute: the middle tooth more produced: the corolla is papilionaceous: banner obcordate, the sides bent down, the back gibbous, the tip emarginate, straight, repelled from the keel: wings oblong, towards the tip ovate, small, bent downwards: keel linear, sickle-shaped, bent upwards, at the tip pressing the banner upwards, obtuse, towards the tip broader: the stamina have diadelphous filaments (simple and nine-cleft), only a little divided at the tip, rolled back: anthers simple: the pistillum is an oblong germ: style cylindric, rolled back in a spiral: stigma obtuse: pericarpium an oblong legume: the seeds kidney-form.

The species are: 1. *G. frutescens*, Shrubby Glycine, or Carolina Kidney-bean Tree; 2. *G.*

limaculata, Two-spotted Glycine; 3. *G. rubicunda*, Reddish-flowered Glycine; 4. *G. coccinea*, Scarlet Glycine.

The first has woody stalks, which twist themselves together, and also twine round any trees that grow near, and will rise to the height of fifteen feet or more. The leaves are in shape somewhat like those of the ash-tree, but have a greater number of leaflets. The flowers are produced in clusters from the axils, and are of a purple colour. They are succeeded by long cylindrical legumes, shaped like those of the Scarlet Kidney-bean, containing several seeds, which are never perfected in this climate. It flowers from June to September.

The second species rises with a twining shrubby stalk to the height of six or eight feet and more; multiplying greatly by age, becoming loaded with a profusion of purple flowers growing in racemes; the richness of the corolla is enlivened by two green spots at the base of the banner. For the most part the flowers go off in this climate without producing any seed-vessels. It begins to flower in February, and continues during the summer. It is a native of Botany Bay.

The third has a shrubby, slender, twining stem, five or six feet high and more, red, branched, leafy. The leaves ternate, on petioles from an inch to two inches in length, channelled above, round underneath: leaflets ovate or elliptic, quite entire, the two side-ones on very short petioles, the end-one on a petiole half an inch in length, bending and swelling immediately under the leaflet, and having there a pair of deciduous stipules. Almost the whole plant is covered with hairs pressed close.

The flowers are of a purplish-scarlet colour. It is a native of New South Wales, flowering from April to June.

The fourth is a shrubby climbing plant, growing to the height of many feet, if supported, and producing a great number of flowers on its pendent branches. The leaflets nearly round, and in the older ones especially curled at the edges. The flowers for the most part in pairs, of a glowing scarlet colour, at the base of the keel somewhat inclined to purple; the bottom of the banner is decorated with a large yellow spot, verging to green. It flowers from April to June, and is a native of New South Wales.

Culture.—The first sort is increased by laying down the young branches in the early autumn. When well rooted in the following autumn, they may be taken off and planted where they are to remain, or in nursery-rows, being watered when the weather is hot, and the roots

protected in the winter by some sort of strawy material.

They succeed best in dry warm light soils.

The other sorts may be raised by sowing the seeds, when they can be obtained from abroad or produced here, in pots of light earth, in the early spring, being afterwards removed into other pots, and placed in the green-house or Cape stove. Mr. Curtis, however, suggests that the two last may succeed in the open air, when planted out in warm sheltered situations, and protected in the winter season.

They are all ornamental in their flowery climbing nature; the first in the open ground, and the latter in the green-house and stove collections.

GLYCYRRHIZA, a genus furnishing a plant of the herbaceous perennial kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved tubular perianthium, two-lipped, permanent: upper lip three-parted: the lateral segments linear, the middle one broader, bifid: lower entirely simple, linear: the corolla is papilionaceous: banner ovate-lanceolate, straight, longer: wings oblong, very like the keel, but a little larger: keel two-petalled, acute, with a claw the length of the calyx: the stamina have diadelphous filaments (simple and nine-cleft), straight: anthers simple, roundish: the pistillum is a germ shorter than the calyx: style subulate, the length of the stamens: stigma obtuse, ascending: the pericarpium is an ovate or oblong legume, compressed, acute, one-celled: the seeds very few, and kidney-form: calyx two-lipped: upper lip three-parted, lower undivided: legume ovate, compressed.

The species cultivated is *G. glabra*, Common Liquorice.

It has the roots running very deep into the ground, and creeping to a considerable distance, especially where they stand long unremoved. From these arise strong herbaceous stalks, four or five feet high. The leaves are composed of four or five pairs of ovate leaflets, terminated by an odd one: these and the stalks are clammy, and of a dark green. The flowers are in axillary spikes, standing erect, and of a pale blue colour. The pods are short, containing two or three seeds.

This plant is cultivated for its roots, which are useful for different purposes.

Culture.—A light sandy soil is the most adapted to the growth of this sort of crops, as its goodness consists in the length of the roots. The ground in which it is intended to be planted should be well dug and dunged the year be-

fore planting, that it may have become perfectly mellow, and the dung well rotted, and mixed with the earth, otherwise it will be apt to stop the roots from running down and being properly supported; and immediately before planting it should be well dug again to the depth of three spades, and be laid very light.

When thus prepared, fresh plants taken from the sides or heads of the old roots should be provided, care being taken that they have each a good bud or eye, being about ten inches long, and perfectly sound.

The operation of planting them should be performed about the middle of March, which is done in this manner:—a line is first set across the ground, then with a long dibble made on purpose the shoots or cuttings are put in, so that the whole plants may be set into the ground, with the heads about an inch under the surface, in a straight line, about a foot asunder in the rows, and a foot and half or two feet distance row from row.

When the whole spot of ground has been thus planted, a thin crop of onions may be sown over the land. These must be kept perfectly clean by the hoe, care being taken not to cut off the top shoots of the liquorice plants, as it would greatly injure them. All the onions which grow near the heads of the liquorice should also be removed. In October, the shoots of the liquorice should be removed, and a little very rotten dung spread upon the surface.

In the following spring, about March, the ground should be slightly dug between the rows of liquorice, burying the remaining part of the dung, being very careful not to cut the roots.

During the summer they must be kept quite clean by occasional hoeing. The same operations must be annually performed, so as to keep the ground and plants in perfect order.

These plants must remain three years from the time of planting, when they will be fit to take up for use, which should be done when the stalks are perfectly decayed: as, when taken up too soon, the roots shrink greatly, and lose in weight.

In taking up the roots the ground is trenched over row after row to the full depth, and the young shoots taken from the old roots cut into sets for new plantations; which should be made annually, in order to keep a constant succession of roots fit for being taken up.

The great art in this culture is to have the earth well trenched to a proper depth, to have good sets, and to keep the ground afterwards quite clean by hoeing.

GNAPHALIUM, a genus affording plants of the herbaceous and under shrubby kinds.

It belongs to the class and order *Syngenesia Polygamia Superflua*, and ranks in the natural order of *Compositæ Discoideæ*.

The characters are: that the calyx is common, rounded, imbricate, with the marginal scales rounded, scariose, coloured: the corolla compound: corollets hermaphrodite, tubular, with apical females sometimes intermixt: hermaphrodites funnel-form, with a five-cleft, reflex border: the stamina (in the hermaphrodites) have five capillary filaments, very short: anther cylindric, tubulous: the pistillum is an ovate germ: style filiform, the length of the stamens; stigma bifid, in the females, reflex: there is no pericarpium: calyx permanent, shining: the seeds solitary, oblong, small, crowned with a capillary or feathery down: the receptacle is naked.

The species are: 1. *G. arboreum*, Tree Everlasting; 2. *G. ignescens*, Red-flowered Everlasting; 3. *G. orientale*, Eastern Everlasting, or Immortal Flower; 4. *G. odoratissimum*, Sweet-scented Everlasting, or Eternal Flower; 5. *G. margaritaceum*, American Everlasting, or Eternal Flower; 6. *G. plantagineum*, Plantain-leaved Everlasting; 7. *G. stœchas*, Common Shrubby Everlasting, or Stœchas.

The first is a shrub the height of a man, determinately branched. The leaves resembling those of rosemary, crowded, strict, acute, naked, underneath tomentose, as are also the branches; with smaller leaves alternate, remote. The flowers are of a dusky white colour. It flowers most part of the year.

The second species has the stem and leaves woolly; the former a foot high, sending out a few side-branches, terminated by a compound corymb of flowers, the heads of which are small, of a gold colour, changing to red as they fade or decline. Its native situation is not known.

The third has the stem seldom rising more than three or four inches high, and putting out many heads. The leaves are narrow, woolly on both sides, and coming out without order. The flower-stems eight or ten inches high, with narrow hoary leaves all the way, terminated by a compound corymb of bright yellow flowers in large heads, coming out in May, and continuing in succession most part of the summer. It has been long in Portugal.

It is improperly called Eastern Everlasting, according to Martyn, as it is supposed to be a native of Africa.

There is a shrubby variety with narrow leaves, which differs from the other in rising with stalks four or five feet high, dividing into many branches, having long narrow leaves placed alternately; the corymb is loose, with the

flowers on long pedicles, and with broad leaves.

The fourth species has the lower leaves oblong and blunt. The stems about three feet high, dividing into many irregular branches, on which are oblong blunt leaves, hoary on their under side, but of a dark green above and decurrent. The stems are terminated by a compound corymb of flowers, closely joined together, of a bright gold colour, but small, and changing to a darker colour as they fade. It is a native of the Cape.

The fifth has a perennial root, creeping, and spreading far, so as to become a troublesome weed. The stalks extremely downy and white. The leaves are numerous, long, sessile, growing without order round the stem, entire at the edges, dark green, naked above, beneath covered with a thick down, and whitish. The flowering branches form a broad flat bunch: each branch contains numerous crowded heads, on short branched, downy peduncles, but the middle ones sessile. It is a native of North America.

The sixth is perennial. From the main stalk come out runners, which take root in the ground. The stem-leaves are narrower, woolly, alternate. The flowers in a terminating corymb, white and small, appearing in June and July. It is a native of North America.

The seventh has the stem about three feet high, with long slender irregular branches, the lower ones having blunt leaves two inches and a half long, and an eighth of an inch broad at the end; those on the flower-stalks are very narrow, and end in acute points; the whole plant being very woolly. The flowers terminating in a compound corymb, at first silvery, but turning to a yellow sulphur-colour. When gathered before the flowers are much opened, Martyn says, the heads will continue in beauty many years, if kept from air and dust. It is a native of Germany.

Culture.—The first four sorts may be increased by slips from the heads, or cuttings, by planting them in pots of light earth, in the spring or summer months, and plunging them in a moderate hot-bed, refreshing them often with water. When they have taken full root they may be removed into separate pots, and be placed among other plants of the hardy exotic sort. They require the protection of a frame in the winter season.

The seventh species may be increased in the same manner, being planted at once where it is to remain, in a shady sheltered border or other place.

The fifth and sixth sorts may be easily raised by dividing and planting their creeping roots

where they are to grow, either in the autumn or spring.

These three last are sufficiently hardy to stand the open air in warm situations.

They are all ornamental plants, the former in the green-house collection, and the latter in the open ground.

GOAT'S-BEARD. See *TRAGOPOGON*.

GOAT'S-THORN. See *ASTRAGALUS*.

GOLDEN-FLOWER. See *CHRYSANTHEMUM*.

GOLDEN-ROD. See *SOLIDAGO*.

GOLDEN-TREE. See *BOSEA*.

GOLDLOCKS. See *CHRYSOCEMA* and *GNAPHALUM*.

GOMPHRENA, a genus containing a plant of the flowery annual kind.

It belongs to the class and order *Pentandria Digynia*, and ranks in the natural order of *Amaranthi*.

The characters are: that the calyx is a coloured perianthium; outer three-leaved: leaflets two, converging, keeled: the corolla five-petalled, upright: petal subulate, permanent, rude, villose: nectary a cylindric tube, the length of the corolla; with a five-toothed, patulous mouth: the stamina have five filaments, scarcely observable, within the mouth of the nectary: anthers upright, closing the mouth of the nectary: the pistillum is an ovate germ, with a point: style cloven half way, filiform: stigmas simple, the length of the stamens: the pericarpium a capsule roundish, circumcised: the seed single, large, roundish, with an oblique tip.

The species is *G. globosa*, Annual Globe Aramanth.

It is an annual plant, rising with an upright branching stalk, about two feet high: the leaves are opposite, sessile, quite entire, hispid: branches and peduncles also opposite; the latter axillary, long and naked, except that there are two short leaves close under each head of flowers. These heads at their first appearance are globular, but as they increase in size become oval. It is a native of India.

Martyn observes that the flowering heads are beautiful, and, if gathered before they are too far advanced, retain their beauty several years.

There are varieties with fine bright purple heads, with white or silvery heads, which never alter from seeds, with mixed colours, with purple and with white heads, which two last are much smaller and rounder than the others: the plants also grow much larger, and spread more into branches, and are later before they flower;—these are called Bachelors' Buttons in America.

Culture.—These plants may be raised by sow-

ing the seeds annually in pots of light fresh mould in the early spring months, and plunging them in the bark hot-bed. When the plants are up, they should be watered often with care; and, after they have attained some growth, be removed with balls about their roots into other pots, and replunged into the hot-bed. When they have had some growth in this situation, they should be removed into a deep frame, being placed in a fresh hot-bed, to bring them up tall.

They should here be often refreshed with water, and have air admitted freely as the summer advances, till they are capable of bearing it without injury; when about August they may be set out during the day time, being protected in the night, and from wet weather. At this period they should be watered three or four times a week.

They are highly ornamental plants for the principal situations about the house, in assemblage with other potted plants.

GOOSEBERRY. See *RIBES*.

GOOSE-FOOT. See *CHENOPODIUM*.

GORDONIA, a genus containing plants of the shrubby evergreen exotic kind.

It belongs to the class and order *Monadelphia Polyandria*, (*Polyandria Monogynia*), and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a perianthium (double: outer four-leaved, deciduous; inner five-leaved: leaflets roundish, concave (ciliate) permanent: the corolla has five petals, obovate, concave, large, united at the base (one of them ciliate): the stamina have numerous filiform filaments, coalescing at the base into an obtuse body (campanulate, with a five-cleft border): anthers oval, upright: the pistillum is an ovate germ: style short, five-cornered (cylindric): stigmas five, sharp, horizontal: stigma five-cornered): the pericarpium is an ovate capsule, ovate, sharp, five-celled: cells bifid half way, five-valved: the seeds two, with a leafy wing on one side, in two rows in each cell.

The species cultivated are: 1. *G. lasianthus*, Smooth Loblolly Bay; 2. *G. pubescens*, Pubescent Loblolly Bay; 3. *G. Franklini*, Carolina Gordonia.

In the first, the stem is five or six feet high, and branched: the leaves four inches long, and one inch and a half broad in the middle, slightly indented on their edges, and of a thick consistence: the flowers axillary, on very long peduncles; of a yellowish white colour. Some describe it as a tall straight tree, with a regular pyramidal head. It is a native of North America, flowering in August and September.

In the second species, the branches are sub-

pubescent: the leaves as in the first, but with the lower surface very softly tomentose: the flowers axillary, solitary, sessile towards the tops of the branches: the leaflets of the outer calyx subovate, acuminate at the tip, tomentose, and of a white colour; also those of the inner. It is a native of South Carolina, flowering in September.

The third is a beautiful tree-like shrub, which rises with an erect trunk to the height of about twenty feet, with alternate branches: the leaves are oblong, narrowed towards the base, serrate, alternate, sessile or subsessile: flowers towards the extremity of the branches, solitary, sitting close in the bosom of the leaves, often five inches in diameter when fully expanded: the petals snow-white, the lower one hollow, formed like a cap or helmet, entirely including the other four, until the moment of expansion; its exterior surface is covered with a short silky hair: the borders of the petals are curled or plaited. It is a native of South Carolina.

The flowers have the fragrance of the China Orange.

Culture.—These plants, from their being aquatics, are not raised or preserved without great difficulty. It is effected by planting cuttings of the young shoots, or laying them down in the spring season in pots of moist earth, plunging them in the hot-bed, and supplying them freely with water. They are very ornamental stove plants.

GORTERIA, a genus containing plants of the herbaceous shrubby sort for the green-house.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositæ Capitatæ*.

The characters are: that the calyx is common one-leaved, imbricate with spiny scales, the inner ones gradually longer, straight, bristle-shaped, ridged: the corolla compound radiate: corollets hermaphrodite, several in the disk: female fewer in the ray: proper of the hermaphrodite funnel-form, five-cleft; of the female ligulate, lanceolate: the stamina in the hermaphrodites have five short filaments: anther cylindric, tubular: the pistillum of the hermaphrodite is a villose germ: style filiform, the length of the corollet; stigma bifid: of the females, germ obsolete: style none: stigma none: the pericarpium an unchanged, deciduous calyx: the seeds in the hermaphrodites, solitary, roundish; down simple (woolly): in the females, none: receptacle naked (not so in all the species).

The species cultivated are: 1. *G. rigens*, Great-flowered Gorteria; 2. *G. fruticosa*, Shrubby Gorteria.

The first is a low spreading plant, with woody stalks six or eight inches long, trailing on the

ground, having two or three side-branches, each terminating in a close head of leaves, which are narrow, green on their upper, but silvery on their under surface, and cut into three or five segments at the end. The peduncles which arise from these heads are six inches long, naked, and support one large orange-coloured flower: each floret in the ray has a dark mark towards the base, with white intermixed.

Martyn observes, that the green-house can scarcely boast a more showy plant: the flowers, when expanded by the heat of the sun (and it is only when the sun shines on them that they are fully expanded), exhibit an unrivalled brilliancy of appearance. It flowers in May and June.

The second species has a slender stem, three feet high, sending out a few weak branches, which are tomentose and white: the leaves are, like those of Privet, alternate, sharp, petioled, having six or seven serratures bristly at the end: the flowers terminating, subsolitary, peduncled, the peduncle longer than the flower, of a golden yellow colour. It flowers in August and September.

Culture.—The first sort may be increased by planting cuttings of the young shoots in the summer months, in pots filled with light earth, placing them in the hot-bed under bell- or hand-glasses. When they are become well rooted, they must be carefully removed, and placed in other separate pots, and have the management of other tender plants.

The second sort is raised by planting the small heads from the ends of the branches, in the same manner and at the same season, screening them well from the sun. When perfectly rooted, they should be removed with care into separate pots, and be afterwards well secured against the cold and damp of the winter season, by being placed in a dry green-house, as much air as possible being admitted in mild dry weather.

These are all plants that afford variety and effect among other flowering plants in green-house collections.

GOSSYPIUM, a genus consisting of herbaceous annual and shrubby perennial plants.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columnifera*.

The characters are: that the calyx is a double perianthium: outer one-leaved, trifid, flat, larger: inner one-leaved, bluntly emarginate in five rows, cup-form: the corolla has five petals, obcordate, flat, spreading, fastened by their base to the tube of the stamens: the stamina have numerous filaments, uniting at bottom into a tube, separate at and below the tip, lax, inserted into

the corolla: anthers kidney-form: the pistillum is a roundish germ: style columnar, the length of the stamens: stigmas three or four, thickish: the pericarpium has a roundish capsule, acuminate, three- or four-celled: partitions contrary: the seeds very many, oval, and involved in cotton.

The species cultivated are: 1. *G. herbaceum*, Common Cotton; 2. *G. arboreum*, Tree Cotton; 3. *G. hirsutum*, Hairy American Cotton; 4. *G. Barbadosense*, Barbadoes Cotton Tree.

The first has a tapering woody root, with numerous fibres, annual: the seed-lobes two, kidney-form, terminating gradually in a long petiole with the figure of a halved funnel: the stem three feet high, upright, round, pubescent, as is the whole of the herb, at bottom brown, with slight chinks, at top spotted with black: the branches are axillary, scarcely longer than the leaf at their origin: the leaves are alternate, only half the length of the petiole, tomentose, odorous whilst young. The flowers are of a yellow colour. It is a native of the East Indies, and often known by the title of Levant Cotton.

The second species has the stem eight feet high, the thickness of the human leg, with a rugged brown bark, and long, diffused, twisted branches: the leaves are three- or five-lobed, without glands, smooth, scattered, petioled; the lobes short: flowers entirely yellow, terminating, and solitary. A native of the East Indies, &c.

The third has a shrubby stem, a fathom in height, erect, striated: the branches hirsute: the leaves alternate; the upper ones divided, cordate, acute, entire, rough with hairs about the edge; the lower three-lobed, the lobes little divided, ovate, acute, entire, hirsute beneath, smooth above: the petioles round, striated, dotted with black, hirsute: there is a single glandular pore on the midrib underneath, and sometimes two or three on the next nerves: the peduncles are three times shorter than the petioles, thick, stiff, hirsute, dotted with black. The flowers are yellow, and succeed by large pods.

The fourth species has the stem from six to fifteen feet in height, suffruticose, biennial, and smooth: the branches are almost erect, round, and smooth or pubescent: the leaves alternate, the upper three-lobed, the lower five-lobed; lobes ovate, acute, nerved, smooth above but pubescent underneath: petioles five or six inches long, roundish, patulous, smooth or sometimes pubescent: glandular pores commonly three, on the midribs of the leaves underneath: the peduncles opposite to the petioles and shorter, thickish, round, striated, pubescent, one-flowered: the flowers are large, yellow, turning finally red, succeeded by oval pods. It is a native of the West Indies.

Culture.—All these plants are raised here from seed, which must be sown in pots filled with light earth, in the early spring months, plunging them in the common or bark hot-bed. When the plants have attained a few inches in growth, they should be removed into separate pots, and again placed in the common or bark hot-bed, where they must constantly remain.

The first and third sorts, as being annual, must have the seeds sown every year. The fourth is perennial, and the last biennial.

They flower and produce seeds in the stove, where a few plants afford much variety.

In the West Indies, where these plants are cultivated for the cotton which they produce, the seed, according to Martyn, is set in rows, about five feet asunder, at the end of September or beginning of October, being at first but slightly covered; but when grown and strong, the root is well moulded up. The seed is apt to decay when it is set too deep, especially in wet weather. The soil should not be stiff or shallow, as this plant has a tap-root. The ground must be hoed frequently, and kept very clean about the young plants, until they rise to a moderate height, otherwise they are apt to be destroyed by caterpillars. It grows from four to six feet high, and produces two crops annually; the first in eight months from the time of sowing the seed; the second within four months after the first; and the produce of each plant is reckoned about one pound weight. The branches are pruned or trimmed after the first gathering; and when the growth is over-luxuriant it should be done sooner. When a great part of the pods are expanded, the wool is picked, and afterwards cleared from the seeds by a machine called a gin, composed of two or three smooth wooden rollers of about one inch in diameter, ranged horizontally, close and parallel to each other, in a frame; at each extremity, being toothed or channelled longitudinally, corresponding one with the other; and the central roller, moved with a treadle or foot-lathe, resembling that of a knife-grinder, which makes the other two revolve in contrary directions. The cotton is laid, in small quantities at a time, upon these rollers, whilst they are in motion, and, readily passing between them, drops into a sack, placed underneath to receive it, leaving the seeds which are too large to pass with it behind. The cotton thus discharged from the seeds, is afterwards hand-picked, and cleansed thoroughly from any little particles of the pods or other substances which may be adhering to it. It is then stowed in large bags, where it is well trodden down, that it may lie close and compact; for which purpose some water is occasionally sprinkled upon the outside of the

bag. An acre usually produces about two hundred and seventy pounds on an average. For this use the first and last sorts are mostly cultivated.

GOURD. See **CUCURBITA**.

GRAFT, the shoot or scion which is to be inserted into the stock or branch in the operation of grafting. It is sometimes termed *graft*. Shoots or scions for this use should be cut according to the directions given on grafting, and be always made from such as are not too luxuriant in their growth or infected with disease, such as the canker, &c. See **GRAFTING**.

In this operation, though the vessels of the stock and those of the shoot are joined by the process of inoculation, and those of the latter supplied with nutritious materials from the former, their economy remains the same. It has been considered by Mr. Bradley as a sort of planting, the shoot or scion rather taking root in the stock or tree into which it is grafted, than uniting itself with it, as is shown by its preserving its natural purity and use, although fed and supported by a mere crab stock; which it is conceived depends upon some difference in the vessels of the shoot or scion from those of the stock.

GRAFTING, the art of inserting a shoot taken from one tree into the stem or some other part of another, in such a manner as to unite and constitute a perfect plant of the same kind as that from which the branch was taken.

It is by this practice that particular sorts of curious fruit-trees of different kinds are capable of being raised with a certainty of their being the same, or not degenerating. It has been observed, that though the plants raised from seed are liable to run from their kinds, and afford such fruits as are not worth the trouble of cultivation, those procured from shoots taken from such trees as produce good fruit never alter from their kind, whatever the stock or tree on which they are grafted may be; as, notwithstanding the grafts receive their nourishment from the stocks, their varieties are never altered by them, but continue to produce the same kind of fruit as the tree from which they were taken: the only alteration which they undergo is, that when the stocks on which they are grafted do not grow so fast, and afford a sufficient supply of nourishment to the grafts, they do not make so great a progress as they otherwise would do, nor is the fruit they produce so fair, or sometimes so well flavoured.

This process has the advantage, probably from the supply of nutritious matter being not only more abundant but more regular, of rendering the plants or trees which are thus raised more quick in their arriving at the state of maturity or that of bearing.

It is on these different accounts that the practice of grafting is principally had recourse to in raising different sorts of fruit-trees, as well as some particular sorts of ornamental plants of the tree and flower kinds. It also affords the means of growing different kinds of fruits and flowers of the same sort, on the same stock or tree, as several varieties of pears and apples, &c.

There are several different methods of performing this operation, which are distinguished by different terms.

Rind, shoulder, or crown grafting, is that in which the grafts are set in a sort of circle or crown.

It is chiefly practised on large trees, where either the head or the large branches are cut off horizontally, and two or more shoots or scions put in, according to the size of the branch or stem; in performing which the scions are cut flat on one side, with a shoulder to rest upon the crown of the stock; then the rind of the stock is raised up, to admit them between the wood and the bark of the stock, which must be inserted about two inches, so as that the shoulders may meet, and closely join the crown of the stock; and after the whole of the shoots or scions are inserted, all the crown of the stock should be well clayed over, leaving two eyes of the scions uncovered therewith, which will be sufficient for shooting. It is a method of grafting that was much more in practice formerly than at present, owing to the bad success with which it has been attended; for, as the scions are placed between the rind of the stock and the wood, they are frequently blown out by strong winds after they have made large shoots, sometimes after five or six years' growth. Where this method is practised, there should therefore always be some stakes fixed, so as to support the scions until they have almost covered the stock or branch. It is usual to perform the operation in this mode about the beginning of April.

Cleft-, stock-, or slit-grafting, which is practised upon stocks, trees, or branches of a smaller size, as from one to two inches in diameter, and may be used with success where the rind of the stock is not too thick, by which the inner bark of the scion will be prevented from joining to that of the stock. In performing it, the head of the stock or branch must be cut off with a slope, and a slit made the contrary way, in the top of the slope, deep enough to receive the scion, which should be cut sloping like a wedge, so as to fit the slit made in the stock; care being taken to leave that side of the wedge which is to be placed outward much thicker than the other: and in putting the scion into the slit

of the stock, great care must be taken to join the rind of the scion exactly to that of the stock; for, if these do not unite, the grafts will not succeed: when this method of grafting is used to stocks that are not strong, it will be proper to make a ligature of bass, to prevent the slit of the stock from opening; after which the whole should be clayed over, to prevent the air from penetrating the slit, so as to destroy the grafts, only leaving two eyes of the scions above the clay for shooting. It is usually performed about the beginning of March.

Whip- or tongue-grafting is the most generally practised by nursery-men, especially for small stocks, or branches of an inch, half an inch, or less, as the scions much sooner cover the stocks in this method than in the others. It is performed by cutting off the head of the stocks sloping; then making a notch in the slope towards the upper part downward, a little more than half an inch deep, to receive the scion, which must be cut with the slope upward, and a slit made in this slope like a tongue, which tongue must be inserted into the slit made in the slope of the stock, and the scion be placed on one side of the stock, so as that the two rinds of both scion and stock may be equal and join together exactly; after which there should be a ligature of bass put round to fasten the scion, so as that it may not be easily displaced, the whole being afterwards clayed over as in the former methods. It may be performed in the early spring months.

Grafting by approach, inarch-grafting, or ablation, is performed when the stocks that are designed to be grafted, and the tree from which the graft is to be taken, stand so near together as that their branches may be bent and united. It is commonly practised on tender exotic plants, and some other sorts which do not succeed in any of the other methods. In performing the work; a part of the stock or branch is slit off about two inches in length, a smooth part of the stock being always chosen for the purpose; then a small notch made in this slit of the stock downward, in the same manner as directed for whip-grafting; the branch of the tree designed to be inarched having a part slit off in the same manner as the stock, and a slit made upward in it, so as to leave a tongue, which tongue should be inserted into the slit of the stock, joining their rinds equally, that they may unite well together; after which a ligature of bass should be made so as to keep them exactly in their situation, and afterwards this part of the stock clayed over well, to keep out the air. In this method of grafting, the scion is not separated from the tree

until it is firmly united with the stock, nor is the head of the stock or branch, which is grafted, cut off till the same time, and only half the wood pared off with a slope, about three inches in length, and the same of the scion or graft. In this method of grafting, the operation is not performed so early in the season as the others; it being done in the month of April, when the sap is flowing, at which time the scion and stock will join together, and unite much sooner than at any other season or period of the year. It is principally employed in raising jasmines, oranges, and other exotic trees of the harder kinds.

It has been found that the walnut, fig, and mulberry will take by this method of grafting, while neither of them succeed in any of the other modes. Several sorts of evergreens may likewise be propagated by this method of grafting; but all the trees that are grafted in this way are weaker, and never grow to the size of those which are grafted in the other methods; therefore it is rarely practised, except on such sorts of trees as will not take by the other methods of performing the operation.

Root-grafting, which is a late improved mode, is performed by cutting the clean smooth roots of the stocks in pieces five or six inches long, and as large or a little larger than the graft; then they are whip-grafted, and tied together very close, so as to prevent the wet from affecting the wounded parts, planting them so deep as that the graft, which should be four or five inches long, may be about half buried. In this way the grafts themselves will root, and a nearer similitude be preserved to the tree whence the grafts are taken; and after two or three years the stock may be cut quite away, and the graft left to maintain itself. In practising this method the grafts should be an inch or two longer than in the others.

The period or season for grafting should always be regulated by the state of the weather. From the climate being so uncertain in the spring, it is better to defer it till the circulation of the sap is brisk, and the buds of the stocks begin to break into leaves, attention being had that the weak shoots of tender trees will not admit of being so long cut as the more hardy, and that the operation should never be performed while it actually freezes or rains.

Proper grafts.—In providing these, care should be taken that they are shoots of the former year, as when they are older they never succeed well; that they be always taken from healthy fruitful trees, as, when the trees are sickly from whence they are taken, the grafts often partake so much of the distemper as not

to get the better of it, at least for some years; that they be not taken from young luxuriant trees, whose vessels are generally large, continuing to produce luxuriant shoots, and seldom prove fruitful; and that they be taken from the lateral or horizontal shoots rather than the perpendicular ones. They should be cut off from the trees before their buds begin to swell, which is mostly three weeks or a month before the season for grafting; consequently, when they are cut off they should be laid in the ground with the cut part downwards, burying them half their length, and covering their tops with dry litter, to prevent their drying; if a small joint of the former year's wood be cut off with the scion, it will preserve it the better, and when they are grafted this may be cut off; for at the same time the scions must be cut to a proper length before they are inserted in the stocks; but, till then, the shoots should remain of their full length, as they were taken from the tree, which will better preserve them from shrinking; when the scions are to be carried to a considerable distance, it will be proper to put their ends into a lump of clay, and to wrap them up in moss, which will preserve them fresh for a month or longer; but these should be cut off from the trees earlier than those which are to be grafted near the place where the trees are growing. It is, however, always the best practice to cut the grafts as near the time of their being inserted into the stocks as possible.

Stocks proper for grafting upon.—The stocks are the trees or plants for grafting upon; which are either such old trees as are already growing where they are to remain, but the fruit of which is intended to be changed; or such young trees as have been raised in the nursery as a supply to the garden. In the former case, there is no other choice than that of the branches, which should be such as are young, healthy, well situated, and have a smooth bark. Where these trees are growing against walls or espaliers, it will be proper to graft six, eight, or ten branches, according to the size of the trees, by which they will be much sooner furnished with branches again, than when a less number of shoots or scions are put in; but in standard trees, four, or at most six, scions will be sufficient for the purpose.

In choosing young stocks for grafting upon, such as have been raised from the seed, and that have been once or twice transplanted, should always be fixed upon.

After these, those stocks which have been raised from cuttings or layers should constantly be preferred; but those which are suckers from the roots of other trees should be rejected, as

they are never so well rooted as the others, and constantly put out a great number of suckers from the roots, by which the borders and walks of the garden will be always pestered during the summer season. These, besides being unsightly, take off part of the nourishment from the other trees and plants.

And where these stocks have been allowed a proper distance in the nursery where they have grown, the wood will be better ripened and more compact than those which have grown close, and have been there drawn up to a greater height. The wood of these will be soft, and their vessels large; so that the scions grafted into them will shoot very strong; but they will be less disposed to produce fruit than the others; and when trees acquire a bad habit at first it is difficult to reclaim them afterwards. The stocks most adapted to each sort will be explained under their particular genera, and in considering the nature of stocks. See STOCKS.

Implements proper for the work.—These are principally; a neat small *hand-saw*, for cutting off the heads of large stocks; a good strong *knife*, with a thick back, to make clefts in the stocks; with a sharp *penknife*, or *budding-knife*, to cut the grafts with; and a *grafting-chisel* and small *mallet*. Other sorts of instruments are sometimes necessary in performing particular sorts of grafting.

Besides these tools, other sorts of materials are wanted in performing the business, such as *bass-strings*, or *woollen-yarn*, to tie the grafts with; and a quantity of good tough clay, which should be prepared a month before it is wanted, and kept turned and mixed, like mortar, every other day, in the following manner:

A quantity of strong good clay, in proportion to the quantity of trees intended to be grafted, should be provided, and some new well-fed horse-dung broken in among it; and if a little cut straw or hay be mixed amongst it, it will hold together the better. The addition of a quantity of salt will also prevent the clay from dividing in dry weather. These should be well stirred together, putting water to them occasionally, in the manner of making mortar. The whole should be hollowed like a dish, filled with water, and kept every other day stirred. It should be carefully kept from being exposed to frost or drying winds; and the oftener it is wrought over the better.

Some have lately made use of another sort of composition for grafting, which has been found to answer the intention of keeping out the air better than the clayey mixture. It is composed of turpentine, bees-wax, and rosin, melted together; which, when of a proper consistence,

is put on the stock round the graft, in the same manner as the clay is usually applied; and, though it be not above a quarter of an inch thick, it keeps out the air more effectually than the clay; and, as cold hardens it, there is no danger of its being hurt by frost, which is very apt to cause the clay to crack, and fall off; and, when the heat of the summer comes on, it melts and falls off without any trouble. In the using it, a tin or copper pot is necessary, with a convenience under it to keep a very gentle fire with small coal; otherwise the cold soon condenses the mixture. It is necessary not to apply it too hot, lest the graft be injured. A person a little accustomed to this composition applies it very fast; and it is much easier for him to work with than clay, especially when the season proves cold.

In the business of grafting, it is found that in long continued dry seasons the grafts are liable to fail in taking, which is sometimes probably owing to the improper choice of the grafts, as well as to the dry weather. Great care should of course always be taken not to graft with weak shoots, particularly those taken from near the top, but such as are taken from the lower end of the shoots, and in which the wood is plump and fresh; as such as are shrivelled seldom or never take well. Where any have missed in the spring, Mr. Forsyth advises to cut off, about the middle or latter end of June, some fine healthy grafts of the sorts that are wished to graft with, and to open the bark in the same manner as for budding, inserting the graft with a piece of the former year's wood on it; and after this has been done, to rub in with a brush some of the composition in a liquid state; then to wrap bass round it, as is done for spring grafting, leaving about three eyes on the shoot, which should be tied on with the bass as tight as possible; then covering the outside of the bass, thus tied up with the composition to the thickness of about one-eighth of an inch; as well as the end of the shoot, to exclude the air and wet. In about three weeks or a month the grafts should be looked over to see if they have taken. When the graft begins to swell, it will throw off the composition; in which case always remember to apply more, to prevent the air from penetrating the incision or wound.

In the month of September, it should be examined whether the wounds are all healed up, and the two barks perfectly united; which, if they are, slacken the bass; and when they are perfectly healed up, it may be wholly taken off; but if not, the bass must be again tied on, and covered with a composition as before, letting it remain till the following spring. It may then

be taken off; and, if it be found that the two barks have separated during the winter, with the point of a sharp knife all the brown part of the bark (which if left would infallibly bring on the canker) should be cut out, and the composition rubbed into the wound. When the grafts have produced strong leading shoots, the tops of them should be pinched off with the finger and thumb; but if they have not shot strong, they should not be cut till the spring, when they may be cut down to three or four eyes, according to their strength, to make them produce horizontal shoots, and form handsome heads. This sort of grafting should always be performed in moist or cloudy weather, if possible.

Mr. Forsyth says that rubbing a little of this composition into the incision will effectually prevent the canker, and in applying it round the graft a much less quantity is sufficient than of the clay; as it need not be more than three inches round in grafting small stems or shoots, and in proportion for those which are larger. It keeps the scion moist. When used in grafting, it should be of such a consistence as to work easily with the hand, or a knife, or small trowel, rather softer than grafting-clay generally is. This method, on a fair trial, will, he thinks, be found "a sure, neat, and expeditious way of grafting."

In grafting or budding, it should be performed as near to the upper side of a bud as possible, and "the most proper place for inserting the scion or bud is at the joint a little above the cross shoot."

In respect to the sorts of trees that will succeed upon one another, it may be observed, that all such as are of the same genus, that is, which agree in their flower and fruit, take upon each other; hence all the nut-bearing trees may be safely grafted on each other, as well as all the plum-bearing trees, as the several sorts of plums, almond, peach, nectarine, apricot, &c. but as many of them are subject to emit gum from the parts wounded, as the peach and nectarine kinds, it is found the surest method to bud or inoculate them.

All such trees as bear cones also do well upon each other, though they may differ in one being evergreen, and the other shedding its leaves in winter; as in the cedar of Libanus and the larch-tree, which are found to succeed upon each other; but they must be grafted by approach, as they abound with a great quantity of resin, which is apt to evaporate from the graft when separated from the tree before it is joined with the stock; whereby they are often destroyed. The laurel likewise on the cherry, or the cherry

on the Laurel. All the mast-bearing trees are also found to take upon each other, and those which have a tender soft wood do well if grafted in the common way; but such as are of a firm contexture, and are slow growers, must be grafted by approach.

It is likewise by this method that many kinds of exotic trees are not only propagated, but also rendered hardy enough to endure the cold of our climate in the open air; as by being grafted upon stocks of the same sort which are hardy, the grafts are rendered more capable of enduring the cold.

GRAINS OF PARADISE. See AMOMUM.

GRASS-GROUND, the parts of ornamented grounds which are kept in the state of short Grass or sward. Those spaces which are extended in the fronts of the houses or habitations, and are termed lawns, are mostly kept in short grass, which by their constant verdure, summer and winter, and open rural appearance, exhibit a fine imitation of nature at all seasons, especially when the side-boundaries terminate in rural plantations in various natural curves and bendings. This mode of laying out pleasure-grounds prevails much at present. But besides these, it is the practice to have rural short Grass openings continued between the plantations throughout the different districts of grounds of this sort, separating and bounding the shrubby clumps, borders, and other parts, in some places widely spreading, in others more contracted; but, in either case, extending to the boundaries of the several plantation compartments, in various bendings, sweeps, and curves; by which the whole is rendered rurally ornamental, and at the same time more agreeable and easy to walk on than gravel between the plantations when the weather is dry and hot during the summer season. In the antient style of gardening, it was much the custom to have straight short Grass-walks, both for ornament and common walking upon; but for ornament, unless elegantly wide and spacious, they have a littleness in their general appearance, as may be seen where long narrow slips of short Grass-Ground are extended to some distance, in the way of walks; and for the latter purpose they are very improper in winter and all moist weather; and even in summer in the mornings and evenings, as being always damp and dewy. Walks of this kind should therefore be but sparingly introduced; and where any are made for variety, ornament, or summer's walking, they should be as spacious as the situation admits, not less than from ten to fifteen feet wide, and even twenty feet wide or more, when the walk is considerably extended in length.

The method of forming short Grass-Ground

work, is either by sowing the parts with Grass seeds, or by laying them with turf, cut from a fine field, common or down; the latter of which, where it can be obtained at a moderate expense, is greatly preferable, as it not only at once forms a complete sward, but is generally more close, even, and smooth, as well as less apt to run up to benty Grass, grow rank, or rise in tufts, than by the sowing method.

In preparing the ground either for sowing Grass seeds upon or laying with turf, the whole must be broken up equally to a moderate spade deep, clearing out all roots of perennial weeds and other coarse materials. When this has been done, stakes or wooden pegs, with notches, for marking the level, according to the position of the ground, must be driven in; then proceed with line and spade to rough-level the ground according to the marks or levels on the pegs, afterwards treading, rolling, or ramming the whole down equally, that it may no where sink in hollows afterwards. When this has been finished, the levels should be wrought off more accurately, and the whole finished with a neat raking, clearing off all large stones, and making an even and smooth surface; in this state, it may either be sown with grass seed, or laid with turf.

For the first method, the proper seasons for sowing are either February, March, and April, or in August or September, in moist weather. In moist wet soils the former is probably the best, but in those of a dry gravelly nature, the latter. In this business it is of the utmost consequence to procure good seeds; those from hay-stacks or out of hay-lofts are often used, which may answer well, where the hay was the growth of some fine pasture free from weeds, and naturally afforded fine turf when grazed and mowed; but in other cases, there is often a mixture of various sorts with weeds, by which the sward is rendered irregular and foul, and never makes handsome short Grass-Ground. If you are not furnished with seeds of your own, they may be obtained from the seedsmen, and should be of those kinds which strike deep root, spread out laterally in their tops, are permanent, and capable of resisting the effects of heat; there are many of this kind. The seed must be sown broad-cast, very thick and regular over the surface, and directly raked or harrowed in; and when the surface is dry, it should be rolled with a wooden roller, to bury the seeds more effectually and make a smooth surface; when the grass comes up, all weeds should be removed; and, the same season, when the sward is become thick and green, and advanced some inches in growth, it should be mowed, rolling it well afterwards, and continue mowing it and rolling

two or three times the first summer, especially if it were sown in spring; as the oftener it is mowed and rolled, the thicker and finer it will grow; and, if it be intended to keep the Grass tolerably fine, mowing will be requisite once a week or fortnight, according to the growth, from April till October, and rolling once a week or fortnight, in moderately dry weather; and occasionally in the winter season. In this way a good turf may be formed in a few years.

In the second method, which should always be employed where it can with convenience, the best turf is that of a fine pastured common or down, where the sward is fine and short.

The best season for laying the turf is from September till March or April, though it will grow at almost any time of the year, even, if there be occasion, in summer.

Turf for this use is mostly cut or flayed with an iron instrument called a turfing-iron; all the turfs being cut of an equal width, length, and thickness; the proper size is a foot wide, a yard long, and about an inch in thickness. They should be first marked by a line, the proper width, length, and depth, and then cut with a racer or cutter, first longways a foot wide, then across in yard lengths, proceeding afterwards to cut them up; having particular regard to cut them level, all an equal thickness, otherwise it will be impossible to lay them level. As they are cut, they should be rolled each up close and tight, the grass side inwards, and piled up by tens, especially if they are cut by the hundred, which is mostly the case. This is usually done at from about a shilling to fifteen-pence the hundred, according to the nature of the soil, as whether soft and easy to cut, or hard and stony. A man will cut from three to five, six, or seven hundred a day, or more, if very soft easy-cutting turf, with a person to race them out, and roll them up, as they are cut.

The method of laying them is very easy: they are placed regularly turf and turf, unrolling them as they are laid, joining them up quite close edge to edge, and making good all deficiency of broken parts as the work proceeds; and as soon as laid, they should be well beaten with broad heavy wooden beaters, as flat pieces of elm or oak plank, two inches thick, fifteen or eighteen inches long, and a foot broad, having long handles fixed slanting in the middles of the upper side. With these beat the grass regularly all over, and then roll it well with a heavy iron or stone roller, repeating these operations in moist weather.

When very dry hot weather succeeds, so as to occasion the turf to shrink and open at the joints, a good watering is of much advantage.

The management of short Grass-ground after it has been thus laid down, is that of mowing it in summer frequently, to keep it short and fine, like a pastured down; poling occasionally with a long pole, to scatter the worm-casts, which greatly deface all short grass, and rolling it frequently both to take up the scattered worm-casts to make the surface clean, and to render it smooth, firm, and even.

Mowing once a week, ten days, or fortnight, or according to its general growth, during the summer, is necessary, especially for the principal home lawns, and other short Grass-grounds in the most conspicuous parts, which parts should always be kept very close and fine, like the sward of a fine pastured down or common: it is performed with a short grass-scythe; and dewy mornings, or moist weather, must always be chosen for the work, as it will be impossible to mow short Grass properly in dry weather. Previous to mowing, it is of advantage sometimes to pole and roll the grass the day before it is intended to mow: in performing the work of mowing, proper attention is necessary not to score, or leave the marks of the strokes of the scythe, which has a very unsightly appearance; to prevent which as much as possible, the point of the scythe should be laid out rather wide, an inch or two beyond the measure of heel and point, especially for very short grass; keeping the point rather out, and not drawing that part too fast inward, gathering the grass neatly to the left in a range, and after having mowed thus to the end of the swarth, to mow it lightly back again, in order to trim off all scores and other irregularities, unavoidably left the first time in executing the work.

After it has been all thus mown over, proceed to sweep up the mowings of each swarth regularly, by standing in the middle, sweeping it along alternately to the right and left to the end of the swarth, forming all the grass in a range on each side; then sweep up the ranges in large heaps, and carry the whole off directly in a wheel-barrow, large basket, or other contrivance.

The business of poling is performed by a long taper pliable ashen pole, fifteen or eighteen feet long, by passing it backwards and forwards in rather dry weather, so as to break and scatter the worm-casts about. The grass should be afterwards rolled with a wooden roller when the surface is a little moist, but not too wet, by which the earth will all adhere to the roller, and render the surface perfectly clean; the work being repeated, as there may be occasion, the year round; and in mowing-time, if the surface is foul, it is particularly necessary to pole and roll on the day previous to mowing, by which a clean

smooth surface will be provided, so as to be able to mow close, even, and more expeditiously.

In the rolling of short Grass-ground, it should be performed occasionally with a wooden roller, and a heavy iron or stone roller: the wooden roller is proper after mowing, to clean up the worm-casts and smooth the surface, being performed when the surface is not very wet, especially if full of worm-casts, as it would otherwise plaster and daub the grass, and render it unsightly; the heavy iron or stone roller should be used occasionally, when the surface is dry, to press down all inequalities close, so as to preserve a firm, even, smooth surface. And in fine-kept short Grass-grounds, the rolling should be performed occasionally a day or two before mowing, to settle the surface firm and smooth, which greatly contributes to the easy and exact performance of the work: the business of rolling in small or but moderately large short Grass-grounds is mostly performed by men; but in very extensive grounds, it is sometimes done by a horse; having a large roller for the purpose, with shafts like a cart, and the horse at the time wearing a sort of leather shoes, very broad at bottom, made so as to lace on occasionally like men's half-boots, to prevent his feet cutting the surface in holes, and rendering it uneven.

Where short Grass-grounds are defaced by wild daisies, dandelion, or other weeds, the first may be removed by having the blade of an old broadsword fixed in the end of a long pliable pole, which, as it cuts both ways, by sweeping it backwards and forwards it will head down the daisies at a great pace; which may be repeated two or three times a week, or as often as there may be occasion.

The others should be extirpated by means of an iron for the purpose, made in the form of a small docking-iron.

In the autumn-finishing mowings, the grass should be generally cut down as close and even as possible, that the sward may remain in a neat even surface over the winter season.

These directions for the management of short ornamental Grass-grounds regard only such as are required to be kept constantly short, close, and even in the surface, as is necessary in the principal lawns, plats, walks, and other divisions, situated within the limits of the main pleasure-ground. In the outward considerably extended districts continued into fields, parks, &c. it is not necessary to have them cut so frequently; two or three common mowings in a summer, with occasional rollings afterwards, may be sufficient.

GRAVEL, a small stony substance made use of for the purpose of constructing roads, walks, and paths. Walks formed of this material are great ornaments to gardens and pleasure-

grounds, as well as useful for common walking upon.

The best Gravel for these purposes, is that which is naturally composed of irregular pebbles and flints, having a moderate proportion of a yellowish or brownish sandy loam, to make it bind, and give colour: it is obtained in fields and commons in many parts, at from one to three or four feet under the surface, though not equally good in all parts in respect to quality and colour; some having a greater or lesser proportion of pebbles, a larger or smaller proportion of loam, which is more or less sandy or clayey: it is the colour of the loam principally which constitutes the beauty of Gravel-walks; that of a deepish yellow or reddish colour being the most eligible, as when formed into well-laid walks and rolled, it has an exceedingly beautiful and ornamental effect. Where such Gravel can be procured within a moderate distance, and easy expense, it is preferable to all others; in some parts, Gravel is of an iron-mould colour, or of a dusky-brown hue; which may nevertheless be of a proper quality for walks, where the colour is disregarded.

Whatever colour the Gravel may have, its proper quality for walks is, a due proportion of moderate, light, sandy loam, to make it bind close and firm at all seasons; but not so redundant, or so clayey, as to be clammy and stick to the feet in wet weather, or so sharp and sandy as to become open and loose in dry weather.

In some places, no other Gravel is met with but such as is very loose, sandy, or pebbly, and which has scarcely any binding materials amongst it; which kind never of itself binds, but always remains open and loose, being at all times disagreeable to walk on: this, therefore, must be mended by a mixture of light sandy loam, where practicable, adding about one load to every two or three of Gravel, casting them together, and turning them over two or three times, that they may be well blended and incorporated; and this, when formed into a walk, will often bind close, firm, and smooth at all seasons.

In preparing the Gravel for walks, it should not by any means be finely screened, as is often the practice: as it is dug out of the pit, it is only necessary to cast it up in a heap, or long ridge, all such large rough pebbles only as roll down being cleared away; as if screened from the stones, it partakes too much of the loam, so as always to stick to the feet at every flash of rain.

In purchasing Gravel for walks, it is mostly from about two to five or six shillings or more per cartload for three horses; though the price differs greatly in different parts, and according to the nature of the Gravel.

In respect to the distribution of Gravel walks in pleasure-grounds and gardens, for ornament or use, large ones are necessary to proceed immediately parallel to the house, extending each way towards the side districts of the garden and ornamented grounds: according to the former style of gardening, a large walk of this kind was usually extended in a straight line from the front of the habitation along the middle of the pleasure-ground, sometimes having grass plats continued on each side, and sometimes spacious borders furnished with curious shrubs and flowers. But in modern designs these middle walks are rarely admitted, especially in spacious grounds, having nothing in front beyond the parallel habitation-walk, but an open rural grass lawn, free from all intersections of walks, &c. However, a good walk closely parallel to the house is indispensably necessary, both for ornament and convenience; and from this, side-walks should branch off, communicating with the other parts of the pleasure- or garden-grounds; one in particular to be extended in a serpentine manner quite round the ground, others leading in the same manner through the interior parts, so as to have dry firm walking at all times to every part of the ground or garden without coming upon the grass.

The dimensions for Gravel-walks, must be regulated according to the extent of the grounds or gardens, as from five to twenty feet or more in width; but all principal walks should be at least eight or ten feet wide; and in large grounds or gardens, leading directly from the house, they should be ten, fifteen, or twenty feet wide at least. Where the houses and gardens are very large, the main walks contiguous to the mansion are sometimes made thirty or forty feet wide; the boundaries on each side being sometimes in grass widely extended, and sometimes in borders for flowers and other curious plants, having either narrow verges of grass, or edgings of dwarf-box, or thrift, on the sides of the walks.

In forming walks of this sort, they should be first staked out to the proper width, and then the boundaries formed, each side of equal level, corresponding to the adjacent ground; the cavity of the walk for the reception of the Gravel being afterwards made, the whole space being dug out ten or twelve inches deep, to allow for a proper depth of Gravel, both to prevent weeds rising from the ground below, and worms from casting up the earth; as also to allow of a proper depth for turning the Gravel occasionally when the surface becomes foul: the earth dug out to form the cavity of the walk, may be used to raise and form the ground on each side, if necessary, which, and the edgings, should always

be completed before the Gravel is begun to be laid.

When the cavity has been thus prepared, any hard rubbishy materials may be laid in the bottom, several inches thick; such as coarse Gravel or ballast, rough stony lime, brick, or other rubbish, which will greatly prevent worm-casts, and help to drain the moisture from the top of the walk in wet weather, and in winter preserve a dry surface: the proper Gravel is then to be laid six or eight inches thick; in laying, raising the middle higher than the sides, in a gradual rounding form; which is not only necessary to throw off the wet, but also to give the walk a more ornamental appearance; the proportion to be observed in this is, for a walk of five or six feet width, an inch and a half of rise in the middle; for one of ten or twelve feet, two and a half inches; and for one of twenty feet, from three to four or five inches; the same proportion being regarded in other widths. At every ten or fifteen feet, as the work advances in laying, it is proper to tread, rake, and roll the Gravel down, as it always rolls more firm and smooth whilst fresh stirred; it is also necessary, for fear of rain, especially in loamy Gravel; for which reasons more should never be laid in one day than can be finished off, except the rough laying. The treading should be performed regularly with the feet pretty close, taking short steps; so as to render every part equally firm, and not to sink in holes under the feet, in the work of raking and rolling. The raking should be performed regularly lengthways of the walk; and in the finishing off or smooth-raking, a wooden-headed rake without teeth is most eligible, or the back of any common rake; as by either of these the surface may be rendered more regular and even without drawing off the requisite proportion of top pebbles, or raking them into holes or heaps; as the art of smooth-raking is to leave all the proper-sized top stones equally dispersed over the surface. As soon as any part is thus laid and raked, it should be well rolled, both across and lengthways; and when the whole is laid, a good rolling should be given the whole length, repeating it till the surface is rendered perfectly compact, firm, and smooth; and after the first shower of rain, another good rolling should be given, so as to make it bind like a rock. This method should be practised in all walks made with this material.

The management afterwards is, occasional weeding, sweeping, and good rolling once or twice a week, especially in the advanced part of spring, and all summer; and also occasionally in winter, in dry open weather; and when the surfaces become very foul, or overrun with

small weeds or moss, as is often the case, they must be broken up in spring, and turned, the surface to the bottom, and the bottom to the top, by which the weeds and moss will not only be buried, but the walks appear as fresh as when new laid. The custom of breaking up Gravel-walks in the beginning of winter, and laying them up in rough ridges, to destroy weeds and moss, is not eligible for general practice, or only occasionally, where any walk is exceedingly over-run; it is mostly more advisable to permit all the principal Gravel-walks to remain undisturbed, at least till the spring, when, if it appear necessary, the whole may be broken up, regularly turned, and re-laid in a neat manner.

The turning of Gravel is a sort of slight digging, the foul surface being turned down and the fresh up; some have it performed regularly once a year in the early spring, in order to preserve the colour. In these cases, the laying, raking, and rolling are performed the same as in the first constructing the walks.

The rolling should be performed once a week at least, in summer, but if two or three times, the more beautiful the walks will appear, and it will tend greatly to destroy weeds and moss: it is mostly a rule among gardeners, to sweep and roll every Saturday. During the summer it is of much advantage to give a good rolling after rain, which preserves a compact smooth surface.

GREEN-HOUSE, a sort of building fronted and covered with glazed frames, destined for the purpose of preserving various sorts of exotic plants through the winter season: the aid of artificial heat is not here necessary, except in very intense cold weather. It is advisable, in constructing such houses, to erect flues to use occasionally, which may prove serviceable, not only in severe frosts, but also in moist foggy weather, when a moderate fire now and then will dry up the damps, which would otherwise prove pernicious to many of the tender kinds of plants.

It differs from the conservatory chiefly in this circumstance, that the plants, trees, or shrubs are in pots or tubs, and placed upon stands, frames, or stages, during the winter, to be removed to proper situations in the open air in the hot summer season; while in that there are beds, borders, and clumps laid out in the ground plan, and made up with the best earthy materials to the depth of three or four feet, in which the shrubs, trees, &c. are regularly planted; the whole of the roof being removed during the summer to admit fresh air, and replaced on the approach of the autumn, to remain till the following summer.

Green-Houses are at present mostly contrived to stand in the pleasure-ground, near to the house if possible. They should be upon a somewhat elevated and dry spot, full to the south, and where the sun has access from its rising to its setting: the buildings are commonly of brick or stone, having the fronts and tops almost wholly of glass-work; and ranging lengthways east and west. They are generally constructed upon some ornamental plan. As to the general dimensions in respect to length, width, and height, they may be from ten to fifty feet or more in length, according to the number of plants to be contained; and in width, from ten or fifteen to twenty feet; but for middling houses, fifteen or eighteen feet is a sufficient width; and in height in the clear, nearly in proportion to the width.

The walls on the backs and ends, particularly the former, should be carried up two bricks thick; and if more than fifteen feet high, two bricks and a half thick; at one end of the back wall, on the outside, it is eligible to erect a furnace, for burning fires occasionally, communicating with flues within, ranging in two or three returns along the back wall, having one flue running along the front and end walls, raised wholly above the floor.

The fronts of the buildings should have as much glass as possible, and wide glass doors should be made in the middles, both for ornament and entrance, and for moving in and out the plants. It would also be convenient to have a smaller entrance door at one end: the width of the windows for the glass sashes may be five or six feet; and the piers between the sashes may be either of timber, six, eight, or ten inches wide, according to their height, or, if of brick or stone-work, two feet wide at least, sloping both sides of each pier inward, that by taking off the angles, a freer admission may be given to the rays of the sun: for the same reason the bottoms of the sashes should reach within a foot of the floor of the house, and their tops almost as high as the roof; and if brick or stone piers two feet wide, shutters may be hung on the inside to fall back against each pier: the roof may be either wholly or half glass-work, next the front; the other half slated, especially if the upright or front piers are of timber; and shutters to cover the top glasses may be contrived so as to slide under the slated roof: where the piers are of brick or stone, it is common to have the roof entirely slated or tiled; but slating is the most ornamental, either for a half or whole roof; and the ceiling within should be lathed, which, as well as the whole inside wall, must be well plastered and white-washed.

In Green-Houses of modern construction, in order to have as much glass as possible in front, the piers between the sashes are commonly of timber only, from six to eight or ten inches thick, according to the height, so as to admit as great a portion of light and heat of the sun as possible, and the roofs wholly of glazed frame-work.

Green-Houses for large collections of plants have sometimes two wings, of smaller dimensions, added to the main building, one at each end, in a right line, separated sometimes from it by a glass partition, with sliding sashes for communication, and the front almost wholly glass-work, and half or whole glass roofs. Thus by these additional wings, the houses consist of three divisions, whereby the different qualities and temperatures of the various plants can be more eligibly suited. The middle or main division may be for all the principal and more hardy, woody, or shrubby kinds, which require protection only from frost; one of the wings appropriated to the succulent tribe; and the other to the more tender kinds that require occasional heat in winter, but which can live without the heat of a stove.

On whatever plans Green-Houses are constructed, the whole of the inside walls should be neatly finished off with plaster and white-wash, and the wood-work painted white; the bottom being paved with large square paving tiles, or some other similar material.

In the Green-House there should be stands, frames, or tressels, which may be moved in and out, upon which rows of planks may be fixed, so as to place the pots or tubs of plants in regular rows one above another; by which their heads may be so situated, as not to interfere with each other. The lowest row of plants next the windows being placed about four feet from them, that there may be a convenient breadth left to walk in front; and the rows of plants should rise gradually from the first, in such a manner that the heads of the second row be entirely advanced above the first, the stems only being hid; and at the back of the house a space allowed of at least five feet, for the convenience of watering the plants, and to admit a current of air round them, that the damps occasioned by their perspiration may be the better dissipated; which by being pent in too closely often occasion a mouldiness upon the tender shoots and leaves, and when the house is close shut up, this stagnating rancid vapour is often very destructive; for which reason they should never be crowded too close to each other, nor should succulent plants ever be placed among them.

In the annexed plate is the plan and elevation of an improved Green-House, in which fig. 1. is the front elevation, fig. 2. the ground plan, fig. 3. a section.

GREEN-HOUSE PLANTS, such as require the protection of this sort of building during the winter or other season: the following are the principal of the different sorts that require this sort of management.

SUCCULENT KIND.

Agave, *Agave* or *American Aloe*, comprising Common great American Agave, with entire green leaves, and a branching flower-stalk.—Common Agave, with striped leaves.—Virginia Agave, with narrower pale-green leaves.

Aloe, *African Aloe*, containing Mitre-shaped Aloe—Tree, or Sword Aloe—Aloe Ferox—Fan Aloe—Succotorine Aloe—Soap Aloe—Partridge-breast Aloe—Tongue Aloe—Warted Tongue Aloe—Pearl-Tongue Aloe—Cobweb Aloe—Hedge-hog Aloe—Cushion Aloe—Spiral Aloe—Pentangular Spiral Aloe—Triangular Spiral Aloe—*Iris Uvaria* Aloe.

Anthericum, *Spider-wort*, containing Shrubby-stalked, Onion-leaved Anthericum—Aloe-leaved Anthericum—Mock Asphodel Anthericum.

Cacalia, *Foreign Colts-Foot*, comprising Cacalia Ficoides—Kleinia, or Indian Cacalia—Anteuphorbium Cacalia—Papillary Cacalia.

Cactus, *Melon Thistle*, containing Cactus Opuntia, or Common Indian Fig.

Cotyledon, *Navel-wort*, containing Round-leaved—Long-leaved—Hemispherical-leaved.

Crassula, *Lesser Orpine*, containing several species.

Euphorbia, *Euphorbium*, containing most of the sorts.

Mesembryanthemum, *Fig Marigold*, containing many curious species.

Sempervivum, *Live Ever*, or *House-Leek*, containing Tree House-Leek—Variegated Tree House-Leek—Lesser Canary-Tree House-Leek.

HERBACEOUS KIND.

Antholyza, *Ethiopian Corn-Flag*, containing Ringent Scarlet Antholyza—Ethiopian Crimson Antholyza—Cunonia, or Large Spathed Scarlet-Flowered.

Antirrhinum, *Snap-Dragon*, containing Variegated Snap-Dragon—Gibraltar Spotted-Flowered Linaria—Dalmatian Toad-Flax.

Aristolochia, *Birth-wort*, containing Evergreen Aristolochia—Pistolochia, or Small Birth-wort.

Bryonia, *Bryony*, containing African Tuberos-rooted Bryony.

Calla, *Calla*, containing Sweet Calla, or Ethiopian Arum.

Campanula, *Bell-flower*, containing American Bell-flower.

Canarina, *Canarina*, containing Canary Bell-flower.

Canna, *Indian flowering Reed*, containing Common Indian flowering Reed, and varieties—Glaucous Indian Reed.

Crinum, *Asphodel Lily*, containing African Asphodel Lily—Broad-leaved Asphodel Lily.

Cyclamen, *Cyclamen*, containing Persian Cyclamen, and several varieties.

Erodium, *Erodium*, containing Pentandrous Geranium, or Crane's-Bill—Thick-leaved Erodium—Upright—Dwarf Erodium.

Erythrina, *Coral-Tree*, containing Herbaceous Erythrina.

Ixia, *Ixia*, containing African Woolly-headed Ixia—Bulbiferous Ixia—Flexuous Ixia—Corymbous spotted-flowered Ixia.

Leonurus, *Lion's Tail*, containing African Scarlet Leonurus—Striped-leaved Leonurus.

Ornithogalum, *Star of Bethlehem*, containing Cape Ornithogalum.

Tropaeolum, *Indian Cress*, containing Double Indian Cress, or Nasturtium.

SHRUBBY KIND.

Andromeda, *Andromeda*, containing Tree Andromeda, or Carolina Sorrel.

Anthospermum, *Amber-tree*, containing Ethiopian Smooth Amber-tree—Ciliated Amber-tree.

Anthyllis, *Jupiter's Beard*, or *Barba Jovis*—Common Barba Jovis, or Silver Bush—Spanish ternate-leaved Barba Jovis—Dwarf Portugal Barba Jovis—Erinacea, or Prickly Anthyllis.

Arctotis, *Arctotis*, containing Rough-leaved Arctotis—Narrow-leaved Arctotis—Sea Ragwort-leaved Arctotis—Plantain-leaved Arctotis.

Artemisia, *Mug-wort*, containing Tree-Wormwood.

Asclepias, *Swallow-wort*, containing Shrub Asclepias.

Asparagus, comprising White Prickly Asparagus—Declinated Bristly-leaved Asparagus—Acute-leaved Asparagus—Retrofracted Great Prickly Asparagus.

Aster, *Star-wort*, containing Shrubby African Aster.

Astragalus, *Milk-vetch*, &c. comprising the Tragacanth, or Goat's-thorn, and several varieties.

Atropa, *Deadly Night-shade*, containing Shrubby Deadly Night-shade of Spain.

Baccharis, *Ploughman's Spikenard*, containing Ivy-leaved Baccharis—Oleander-leaved Baccharis—Halimus-leaved Baccharis.

Bosea, *Yerva-mora*, or Shrubby Golden-rod Tree.

Brunia, containing Knot-flowered, or Imbricated-leaved—Woolly, heath-leaved—Abrotnoides, or Thyme-leaved—Radiated Brunia.

Bubon, *Macedonian Parsley*, containing Shrubby Galbaniferous Bubon—Shrubby Gum-miferous Bubon.

Buddlea, comprising American long-spiked—Occidental American—Globular-headed Buddlea.

Buphthalmum, *Ox-eye*, containing Shrubby Jamaica Ox-eye—Maritime, or Sea Ox-eye.

Bupleurum, *Hare's-ear*, containing Shrubby Ethiopian Hare's-ear—Shrubby Difforme-leaved Cape Hare's-ear.

Calendula, *Marigold*, containing Shrubby Cape Marigold—Shrubby Grass-leaved Ethiopian Marigold.

Capparis, *Caper Bush*, containing Spinous Capparis, or True Caper Shrub.

Cassine, *Cassine*, containing Cape Phillyrea—Maurocena, or Hottentot Cherry.

Ceanothus, *Ceanothus*, containing African Ceanothus.

Celastrus, *Staff-tree*, containing Pyracantha-leaved Celastrus—Box-leaved—Myrtle-leaved Celastrus.

Ceratonia, *Carob-tree*, comprising Common Carob-tree, or St. John's Bread.

Chamærops, *Chamærops*, containing Dwarf Palm.

Chrysanthemum, containing Shrubby Canary Chrysanthemum—Shrubby Floscular Chrysanthemum.

Chrysocoma, *Goldy-locks*, containing Shrubby Coma Aurea, or Greater African Goldy-locks—Shrubby Nodding Goldy-locks.

Cistus, containing Bay-leaved Cistus—Sea-Purslane-leaved Cistus; and several other species.

Citrus, *Citron-tree*, containing Lemon-tree, and Orange, with all the varieties of each.

Cliffortia, *Cliffortia*, containing Ilex-leaved Cliffortia.

Cluytia, *Alaternoides Cluytia*, containing Purslane-leaved Cluytia—Elateria, or Indian Cluytia.

Colutea, *Colutea*, containing Shrubby Ethiopian Scarlet Colutea.

Convolvulus, *Convolvulus*, comprising Evergreen Canary Convolvulus—Silvery Convolvulus.

Coronilla, containing Valentine Coronilla—Glaucous Coronilla—Silvery Coronilla.

Dais, *Dais*, containing Cotinus-leaved Dais. *Digitalis*, *Fox-glove*, containing Shrubby Canary Fox-glove.

Diosma, *African Spiræa*, containing Opposite-leaved—Hairy-leaved—Red Diosma, &c.

Ebenus, *Ebony*, containing Ebony of Crête.
 Genista, *Broom*, containing Shrubby Canary
 Broom.

Geranium, *Geranium*, containing all the
 shrubby kinds.

Gordonia, *Gordonia*, containing Loblolly
 Bay.

Gorteria, *Gorteria*, containing Shrubby
 prickly-leaved Gorteria.

Grewia, *Grewia*, containing Occidental
 Grewia.

Halleria, *Halleria*, containing African-fly
 Honeysuckle.

Heliotropium, *Turn-sole*, containing Shrubby
 Peruvian Heliotropium.

Hermannia, *Hermania*, containing Althæa-
 leaved—Alder leaved—Lavender-leaved—Goose
 berry-leaved Hermannia.

Hypericum, *St. John's Wort*, containing
 Warty-leaved Minorca St. John's Wort—Ca-
 rolina St. John's Wort—China Monogynous
 St. John's Wort.

Jasminum, *Jasmine*, containing Catalonian
 Jasmine—Azorian Jasmine—Yellow Indian Jas-
 mine.

Iberis, *Candy-tuft*,—Evergreen Tree Candy-
 tuft, Evergreen Striped-leaved Candy-tuft—
 Everflowering Tree Candy-tuft.

Justicia, *Malabar Nut-tree*.

Lantana, *American Viburnum*, containing
 African Lantana, or Ilex-leaved Jasmine—Sage-
 leaved Lantana.

Laurus, *Bay-tree*, containing Carolina Blue-
 berried Bay—Red-berried Bay-tree—Indian Bay-
 tree—Cinnamon-tree—Camphire-tree—Deci-
 duous Bay-tree.

Lobelia, *Lobelia*, containing Shrubby, Pine-
 leaved, Blue Lobelia.

Lycium, *Box-thorn*, containing African Box-
 thorn—Barbary Box-thorn.

Malva, *Mallow*, containing African Shrub
 Mallow.

Medicago, *Medicago*, containing Shrubby
 Hoary Medicago, or Moon Trefoil.

Melia, *Melia*, containing Bead-tree.

Mentha, *Mint*, containing Tree-Mint.

Morea, *Morea*, containing Canaliculated-
 leaved Morea—Rush-leaved Morea.

Myrica, *Gale*, *Sweet Willow*, and *Candle-
 berry Myrtle*, containing Oak-leaved Myrica—
 Æthiopian Heart-leaved Myrica.

Myrtus, *Myrtle-tree*, containing Common
 Myrtle, which comprehends many varie-
 ties.

Nerium, *Oleander*, or *Rose-bay*, comprising
 Common Oleander, with red flowers, scarlet
 flowers, white flowers, double flowers, striped
 leaved.

Olea, *Olive-tree*, containing European Olive-
 tree—Cape, or African Olive-tree.

Ononis, *Rest Harrow*, Shrubby Spanish
 Ononis.

Osteospermum, *Osteospermum*, containing
 hard-seeded Chrysanthemum.

Othonna, *Ragwort*, containing Pectinated-
 leaved Othonna—Southernwood-leaved Othon-
 na.

Passerina, *Sparrow-wort*,—Shrubby African
 Passerina.

Pelargonium, *African Geranium*, containing
 many shrubby species.

Phlomis, *Jerusalem Sage*, containing Yel-
 low Phlomis, and varieties—Purple Phlo-
 mis.

Physalis, *Physalis*, containing Alkekengi, or
 Winter Cherry—Somniferous Winter Cherry—
 Flexuous Winter Cherry.

Pistacia, *Pistachia Nut*, and *Mastic-tree*, two
 or three varieties.

Polygala, *Milk-wort*, containing Shrubby
 Myrtle-leaved Polygala.

Portulaca, *Purslane*, containing Shrubby
 Cape Purslane-tree.

Poterium, *Burnet*, containing Shrubby Prick-
 ly Burnet.

Prasium, *Shrubby Hedge Nettle*.

Protea, *Silver-tree*, containing Common Sil-
 very Protea, or Changing-tree—Coniferous
 Protea.

Punica, *Pomegranate-tree*, containing Dwarf
 Pomegranate.

Rhus, *Sumach*, containing African Hoary
 Sumach, and varieties—African Narrow-leaved
 Sumach, and varieties—Shining-leaved African
 Sumach.

Royena, *Royena*, containing African Blad-
 der-nut.

Rumex, *Dock*, containing Sorrel-tree.

Ruscus, *Knee-holly*, containing Alexandrian
 Laurel—Tongue-upon-tongue Laurel.

Salvia, *Sage*, containing Shrubby African
 Golden-flowered Sage—Shrubby African Blue-
 flowered Sage—Canary Sage—Mexican Sage,
 or Shrubby Mexican Clary.

Scabiosa, *Scabious*, containing Shrubby Sca-
 bious.

Senecio, *Groundsel*, containing Shrubby Af-
 rican Groundsel.

Sideritis, *Iron-wort*, containing Canary Iron-
 wort—Cretan Iron-wort.

Solanum, *Night-shade*, containing Amomum
 Plinii, Bastard Capsicum, or Winter Cherry—
 African Jagged-leaved Solanum, or Pomum
 Amoris—American Twin-fruited Solanum—
 Thorny, Downy Night-shade.

Tanacetum, *Tansey*, containing Shrubby

Æthiopian Tansey—Under-shrubby *Samphire-leaved Tansey*—Tree *Tansey*.

Tarchonanthus, *Tarchonanthus*, containing Shrubby African *Fleabane*.

Tetragonia, *Tetragonia*, containing Shrubby *Tetragonia*.

Teurium, *Germander*, comprising Spanish Tree-*Germander*—Broad-leaved Tree-*Germander*.

Vitex, *Chaste-tree*, containing Evergreen *Chaste-tree*.

Ulex, *Furze*, or *Whins*, containing African Berry-bearing *Furze*.

Xeranthemum, *Xeranthemum*, containing Broad-leaved *Xeranthemum* — Narrow-leaved *Xeranthemum* — Trailing *Xeranthemum*.

Yucca, *Adam's Needle*, containing Common *Adam's Needle*—Thready-leaved *Adam's Needle* — *Aloe-leaved Yucca* — *Dragon Tree-leaved Yucca*.

Zygophyllum, *Bean Caper*, containing Sessile-leaved *Bean Caper*—Purslane-leaved *Bean Caper*.

UNDER-SHRUBBY KIND.

Dracocephalum, *Dracocephalum*, containing Canary *Dracocephalum*, or *Balm of Gilead*.

Gnaphalium, *Gnaphalium*, containing Oriental *Gnaphalium* and varieties—Sweet-scented *Gnaphalium*.

Inula, *Inula*.

Keggalaria, *Keggalaria*, containing African *Keggalaria*.

Lavateria, *Lavateria*, containing Cape *Lavateria*.

Lavendula, *Lavender*, containing Cut-leaved Canary *Lavender*.

Lotus, *Bird's-foot Trefoil*, containing Cretan *Silvery Lotus*—*Lotus Jacobæus*—Upright *Lotus*.

Mediola, *Mediola*, containing Climbing African *Mediola*.

Origanum, *Origany*, containing *Dittany of Crete*—*Dittany of Mount Sipylus*—Cretan *Marjoram*—*Origany of Smyrna*.

Periploca, *Virginian Silk*, containing African Hoary Climbing *Periploca*, and varieties.

Phyllica, *Bastard Alaternus*, containing Box-leaved *Phyllica*—Heath-leaved *Phyllica*.

Phyllis, *Bastard Hare's-ear*, or *Simpla nobla*.

Polium, or *Mountain Poly*, containing *Marum*, or Syrian *Mastich*.

Rhamnus, *Buckthorn*, containing Broad-leaved Indian *Rhamnus*—*Zizyphus*, or *Jujube*.

Selago, *Selago*, containing *Corymb Selago*.

Smilax, *Rough Bindweed*, containing Chinese *Rough Bindweed*, or *China-Root*—*Laurel-leaved Rough Bindweed*, and several varieties of each.

Stæbe, *Stæbe*, containing *Bastard Elichrysum*.

These sorts of plants must constantly be kept in pots, or some large sorts in tubs, for moving into shelter in winter, and into the open air in summer; as, being all exotics from various warm parts of the world, they are of tender growth in this climate, and consequently not able to live in the open air in the winter.

The pots and tubs for containing them must be of different sizes, according to the size and nature of the plants, which, as they advance in growth, should have larger pots, &c. accordingly; and when they become too large for the pots, they must be shifted into tubs hooped with iron, with two iron handles to each at top.

And in potting or planting the different sorts, care should be taken that the pots or tubs have holes at bottom for the discharge of redundant moisture; each hole being covered with a piece of tile or oyster-shell before the mould is put in, to prevent their being stopped up, and the earth from being washed out.

The modes of propagating the different sorts, the nature of the earth in which they succeed best, and the season of raising them, are fully explained under the culture of the respective kinds.

General Management of Green-House Plants.

As most plants of this sort are capable of bearing the open air from the latter end of May till October; but the rest of the year demand the protection of the green-house, they of course require to be set out as soon as the weather begins to be suitable, in the spring and summer months; especially for such as all the varieties of *Myrtles*, *Geraniums*, *Oleanders*, *Cistuses*, *Phlomis*, *Shrubby Aster*, *Tree-Wormwood*, *Tree-Candy-tuft*, *Yellow Indian* and *Spanish Jasmines*, *Indian Bay*, &c. And this should be done in the last week in May or first in June, according as the season proves more or less favourable for all the other sorts: but it should not be attempted until the season is become perfectly settled, and there is a fair prospect of summer being arrived, as there are often very cold nights, and frequently frosty mornings, in May, and even in the beginning of June, which, if the plants were fully exposed, would pinch the ends of their young shoots and leaves, and greatly injure them. A mild warm day should be chosen for this work; and if a warm rain, it will be of much advantage, as it washes the leaves and branches from the dust they have contracted, and greatly refreshes the plants.

Setting out the Plants.—This is done in the more hardy sorts in their pots, about the middle of May.

When first brought out, it is proper to place them in some sheltered sunny place, for a fortnight, till they are inured to the open air; then to set them in any open exposure, where they

are to remain for the summer. And as soon as they are brought out, they should be cleared from all dead leaves, and all dead wood; and the earth on the surface of the pots be stirred, taking a little of the old out, and adding some fresh mould in its stead, which will prove very beneficial; then give a moderate watering, not only to the mould, but also all over the heads of the plants, to clean them effectually from all dirt and filth which they may have contracted in the green-house.

They may be placed according to the fancy of the proprietor; some of the handsomest plants being occasionally placed to adorn spacious fore-courts, or arranged on each side of large walks contiguous to the main habitation; and others near ornamental garden-buildings; they are also sometimes disposed in groups or small clumps in the most conspicuous places, in different parts of the pleasure-ground; exhibiting different sorts in each group, to cause the greater variety and effect.

When thus placed out, their chief culture is, to supply them plentifully with water during that season in hot dry weather: all the woody or shrubby kinds in particular, likewise the herbaceous kinds that are not very succulent, require it three times a week at least; and in a very hot dry time, once every day. The succulent kinds must also have a moderate supply of water two or three times a week in dry weather; the proper time for watering all the sorts at this season is, either in a morning before nine o'clock, or in the afternoon about four or five; for, if performed in the middle of the day in summer weather, the sun would exhale a great part of the moisture before it effected its intended operation on the fibres of the plants: this business should be duly attended to in dry weather. As the mould, roots, and fibres of the plants are circumscribed within the narrow limits of a pot or tub, the earth, as well as the fibres, dries very fast in summer, and necessarily requires frequent refreshments of water, to preserve that due and constant degree of moisture which is requisite for the support of healthy vegetation.

Moderate rains should not prevent watering occasionally, especially such plants as have spreading heads, which prevents the rains, unless very heavy or constant, from falling in sufficient quantities on the earth of the pots, to moisten it properly. And in hot weather, if some mowings of short grass are spread on the surface of the Orange-tree tubs, and others, it will greatly preserve the moisture. During this season, it will also be a good practice to loosen the surface of the earth now and then, in such pots and tubs as have a tendency to bind or become stiff.

Taking in the Plants.—In the beginning of the autumn, as towards the latter end of September, the more tender kinds of these exotic plants must be removed into the house; the succulent tribe, in particular, should be removed to shelter at the first approach of excessive wet, and cold nights. The oranges, lemons, and all the other species, should be moved into shelter in due time, either in the end of September or early in October; for, if they are permitted to remain in the open air till attacked by sharp weather, it changes the beautiful verdure of their leaves to a rusty yellow hue, which they do not recover during winter: therefore, about the latter end of September, or beginning of October at latest, the principal plants should be brought in: the succulent, and others of the more tender temperature, as early in the former month as the cold weather begins to come on; and continue moving in all the others as the cold increases; and by the middle of October, have the whole collection in. As the time approaches for moving in the different sorts, clear them perfectly well from decayed leaves, &c. all the pots being well cleaned, and loosen the surface of the earth in each pot, adding a little fresh mould. As the different sorts are brought occasionally into the green-house, they may be placed promiscuously, till the whole are in, and then be arranged regularly, as they are to remain for the winter; leaving all the windows quite open till that time. When the whole is brought in, they should be disposed in regular order, so as to appear to the best advantage, both in respect to their general arrangement and variety, and so as each may have an equal portion of sun and air: the tallest plants being arranged in the back, the others in their several ranks, according to their degrees of height, gradually down to the lowest in front; and as there is a vast variety, both in size, shape, and colour of the foliage, they should be so disposed as to set off each other, and give a pleasing variety to the whole; and, if possible, they should stand clear of one another; by which each plant will be separately conspicuous, and the whole exhibit a greater air of freedom and variety, as well as admit an equal portion of sun, and a more free circulation of air.

After the plants have been thus collected in, their principal culture is, the supplying them with fresh air at all opportunities in mild weather, and giving moderate waterings occasionally, picking off decayed leaves, cutting out casual decayed shoots, and making occasional moderate fires in severe weather, also sometimes to dispel great damps and noxious fogs.

In respect to giving air, it should be admitted every mild, calm day, by opening the windows more or less, according to the temperature of the

weather. When the plants are first housed, they should have as much free air as the nature of the season will admit, by opening the windows every mild day to their full extent; and if the air is quite temperate, they may remain open on nights for the first week; but in cold nights they should be constantly shut: this work of admitting air must be constantly attended to all winter; for, without a due portion of this essential article in mild weather, the plants soon lose their fine verdure, and assume a sickly yellowish colour, become diseased, and the young shoots, in many sorts, grow mouldy and rot off, and the leaves of the plants drop; therefore, never omit, every mild day, when not very damp or foggy, to open some or all of the windows, little or much, according as the air is more or less temperate: the proper time during winter, for this, is from about eight, nine, or ten in a morning, till three, four, or five in the evening, according to the mildness of the day: but as the days lengthen, and the warm weather increases, give more air in proportion, earlier and later in the day, as may be judged proper, being careful always to shut all close in due time every evening, as soon as the sharp air approaches. In foggy weather it is advisable to keep the windows quite close; for the great damps occasioned by fogs are very pernicious to these plants whilst they are confined in the house: also, when boisterous or cold cutting winds blow towards the front of the Green-house, the whole should be kept shut; or only, if thought necessary, some of the upper sashes drawn down a little way at top, above the reach of the wind rushing immediately upon the plants: likewise, in all frosty weather, the house should be kept close, except the frost is moderate, and the middle of the day sunny and warm, when some of the windows may be opened a little, but shut close again if the sun is clouded, and at any rate before the air changes cold: in severe weather, the shutters, &c. should be shut every night, also occasionally on days when the frost is extremely rigorous, and no sun: and likewise, in such weather, the assistance of fire-heat, as hereafter directed may be necessary. As the spring approaches, and the weather grows warmer, enlarge the portion of air accordingly, admitting it also both earlier in a morning and later in the evening as the days lengthen; for then the plants will begin to assume a growing state, and a considerable portion of air is requisite every mild day, both to strengthen the new shoots and inure the plants by degrees to the air, against the time for removing them into it fully again for the summer season.

Watering will also be necessary to most of the sorts, but must be afforded them as sparingly as possible during the winter months, and scarcely any should be given when the house is obliged to be shut close through the severity of the weather: there are no certain rules to be given for the application of this; some plants require only a little water once a week, or ten or twelve days in mild weather, such as the orange- and lemon-trees, myrtles, oleanders, shrubby-geraniums, and other woody kinds; all that is necessary being just to preserve the earth very moderately moist; the pots and tubs must therefore be examined with proper attention, and water given to such only as are in want. The herbaceous kinds should be rather more sparingly watered than the shrubby sorts; and all the succulent tribe have water but seldom, some not oftener than once a fortnight or three weeks, and that always but very sparingly at each time; and some that are very succulent require but very little from November till March: indeed all the succulents should only have it now and then at this season, when the earth in the pots becomes very dry.

In performing the watering in general, be particularly careful to do it with great moderation whilst the plants are in the green-house; as, if you once over-wet the earth at this season, it will remain so for a long time, and, by chilling the tender fibres of the roots, often prove the loss of the leaves of many of the plants, and even the death of some sorts. On a sunny day, from about eleven to two o'clock, is the proper time for performing this business.

Soft water, if possible, should be used, or at least such as has been exposed to the air two or three days.

During frosty weather great attention is requisite to keep all the windows close, night and day, unless when very moderate, as just observed, and the middle of the day is sunny and warm; when some part of the house may be opened a little for two or three hours, having particular regard to shutting all close in due time in the afternoon, before the air changes to become sharply cold: and in very severe frosts it must be kept close night and day; and the shutters, or other covers of canvass or mats, be also used every night; also occasionally in the day-time, when the weather is intensely severe, and no sun appears, and there are no flues for fires to keep out the frost. The shutters or other shelters, besides the glasses, should however be used as little as possible in the day-time, except in cases of particular necessity, as every opportunity ought to be taken for the admission of light and fresh air, as much as the tempera-

ture of the weather will possibly admit, as most of the plants only want protection from frost and the common shelter of the house, which with shutting the sashes close every night will be sufficient.

Where there are flues for fires, it will be advisable to make moderate ones at such times as the frost cannot be otherwise kept out, especially on nights; but this must by no means be continued longer than is necessary to guard against very severe frosts.

In very cold, foggy, damp weather, a moderate fire now and then in the flues also proves very beneficial in expelling the damp unwholesome vapours, so pernicious to all plants of this nature.

Whilst the plants are in the house, all decayed leaves, &c. should be constantly picked off, being necessary both to preserve the beauty and health of the plants. The decayed leaves of the succulent kinds should be cut off close with a sharp knife; the plants in general should likewise be occasionally cleaned from any filth they may contract in the house, such as dust, cobwebs, &c.

General Culture of the Plants.—This sort of plants generally want shifting into larger pots and fresh earth as they advance in growth; such as are fast growers, as some of the shrubby geraniums, &c. annually, or every other year; and some plants in large pots, &c. once in two or three years, and others not so often, especially some large grown American aloes, orange- and lemon- trees, and those in large tubs, having a considerable substance of earth about the roots. Sometimes these and other similar kinds, when not convenient to shift them, have the top earth, and a little down round the sides, loosened to some moderate depth in the spring, removing the loosened soil, and filling the space up with fresh compost. But as the plants in general increase considerably in proportion to their nature of growth, shifting into larger pots or tubs, with some fresh earth, should not be omitted occasionally as it may seem necessary, as it proves beneficial to most of the sorts. They may most of them be shifted with the ball of earth about their roots entire; but others, that are rather weak and sickly, require shifting into entire fresh earth.

The most proper time for shifting all the sorts is in April, or before they are removed into the open air for the summer; but it may be occasionally done in autumn, as in August, or the beginning of September, in time to strike fresh root before winter. In the work of shifting, each plant should be drawn out of its pot or tub with the ball of earth about its roots entire, then

all the dry matted fibres round the outside of the ball pared off and cleared away, also some of the old earth at the sides, bottoms, and tops: then having the new pots and fresh earth ready, the holes at the bottoms of the pots should be covered with pieces of tiles or oyster-shells, and some of the fresh earth put in; placing the plant in the pot, and filling up the vacancy all around with more fresh compost, bringing it an inch over the top of the ball, giving a good watering, to settle the earth close in every part: after this it is necessary to place the plants to have shade from the mid-day sun for a week or fortnight.

Such plants as are become of a weak sickly nature should, at shifting, have all the earth taken clean from about their roots, having them washed, and then planted into entire fresh earth.

The larger sorts of plants, such as the orange-trees, lemons, citrons, American aloes, and others of similar growth, should be shifted, when large, from pots into tubs hooped with iron, having two iron handles at top for the convenience of lifting them in and out of the green-house, as they sometimes grow to so large a size as to require two, and sometimes three or four, men to move them.

All such plants as are not shifted annually should, in spring, have the earth in the tops of the pots or tubs loosened to a little depth, also a little way down round the sides, taking the loosened earth out; and in its stead adding a quantity of fresh mould, giving it directly a little water to settle it close. This should never be omitted.

At any time when the surface of the earth is observed to be stiff, whether in the shifted or unshifted plants, it is of much service to stir it an inch in depth occasionally, and add a little fresh compost when necessary.

The mould or compost into which the plants are to be shifted is of considerable importance. The best is obtained from commons where sheep and cattle pasture, particularly in low places, where the finest grass grows, and the soil is deepest. A foot of the top soil with the turf should be taken off, and if a sandy or hazel loam it will do alone; but if a strong loam, some sand and black peaty or moorish soil should be added. Such soils should be laid in a heap six winter months or more, and frequently turned over. Some plants, as aloes, mesembryanthemums, ixias, and exotic liliaceous plants in general, require a soil which is a degree lighter, and which does not retain the water, but lets it pass readily. A little coal-ashes at the bottom of each pot is useful in this view.

Most of the ericas, or heaths, and other beautiful plants from the Cape of Good Hope, from America and Botany Bay, delight and flourish in that sort of earth which comes nearest to their native soil: thus, the heaths like a black peat or moorish soil; and the others, that which is made a degree stronger with loamy earth.

Keep the heads and every part clean from dust and other filth, by occasionally washing with water in all the sorts, which in most is done by waterings over their heads; but in others, when very foul, by washing their leaves with a sponge and water, especially in winter. This is often necessary to the oranges and lemons, and other large-leaved kinds of plants.

When the heads of any of the shrubby kinds are become very irregular or shabby, the branches may be pruned, shorter or longer as necessary, in the early spring.

And where any of the principal exotics assume a declining state, such as oranges, lemons, &c. or have thin, straggling, weakly heads, or are apt to drop their leaves, it is proper either to shift them wholly, or apply some fresh earth to their roots, and then prune the heads moderately close in the early spring, plunging them in a bark-pit under glasses. The heat of the bark-bed so greatly revives their growth, that they break forth into many strong new shoots, and form handsome renewed full heads in the summer.

While in the green-house, some plants drop all their leaves, either by the effects of cold, or over-watering, or sometimes by being kept long in too dry a state, as frequently occurs in myrtles and geraniums, and sometimes oranges, lemons, and others; in which case, it is proper in the spring to prune the heads, shortening the long strong shoots and branches, and to shift them with balls into fresh earth, or, if not shifted, to loosen the earth in the tops and sides of the pots, drawing out the loosened mould, and supplying the place with fresh. They afterwards soon push forth into young shoots and leaves, and renew their heads with verdure. Sometimes myrtles, geraniums, &c. in this state, when headed, may, on being brought forth in the summer, be drawn out of the pots, and plunged in the ground in a sheltered situation, and watered in dry weather; when they will send their roots into the full earth, and break forth strongly at top into young wood and foliage, and form full heads, being then re-potted with balls of earth to the roots.

The heads of green-house plants should never be clipped with garden-shears, nor, by any mode of pruning, trimmed into any

formal figure, as sometimes practised; but every sort be let assume its own natural growth, only just using the knife to regulate any very irregular or rambling shoot or branch, or to thin out some where too much crowded, and to cut out the dead wood they may contain.

GREWIA, a genus containing plants of the tender shrubby kind for the green-house.

It belongs to the class and order *Gynandria Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a five-leaved perianthium: leaflets lanceolate, upright, leathery, coloured within, spreading, deciduous: the corolla has five petals, the same form with the calyx, often smaller, emarginate at the base: the nectary a scale inserted into each petal at the base, thickish, bent in, inclined to a rim surrounding the style: the stamina have very numerous filaments, the length of the petals, bristle-shaped, inserted into the base of the germ: anthers roundish: the pistillum is a pedicelled germ, roundish, sitting on a columnar, upright receptacle, surrounded by a five-cornered rim: style filiform, the length of the stamens: stigma obtuse, four-cleft: the pericarpium is four-lobed, four-celled: the seeds solitary, globular, and one-celled.

The species cultivated are: 1. *G. occidentalis*, Elm-leaved Grewia; 2. *G. orientalis*, Oriental Grewia.

The first grows to the height of ten or twelve feet, and has a stem and branches very like those of the small-leaved elm, the bark being smooth, and of the same colour as that of elm when young: the leaves are also very like those of the elm, and fall off in winter: the flowers are produced singly along the young branches from the axils, and are of a bright purple colour; they appear towards the end of July, and continue through August to the beginning of September, but are never succeeded by fruit in this climate.

The second species, in its native situation, is a tree of a middling size: the leaves serrate, petioled: peduncles from the axils, tomentose, trifid, three-flowered: berry sub-globular, depressed, becoming obtusely four-cornered in drying, succulent; the skin, when fresh, saffron-coloured, villous; flesh pulpy, fugacious; stones hard, like grape-stones, having a deep furrow on the back, two-celled. It is a native of the East Indies, flowering in July and August.

Culture.—These plants are capable of being increased by cuttings or layers.

In the first method the cuttings should be made in the early spring, and planted in pots

filled with earth of the light soft loamy kind, being plunged in a bark hot-bed, and well shaded and watered. When they have taken root, they should be gradually inured to the full air, in order to be placed in a warm situation in it till the autumn, when they must be protected in the green-house.

The layers may be laid down in the early spring, and when they have stricken good root be taken off, and planted out in separate pots in the same manner as the cuttings, and afterwards managed in the same way.

The proper periods of removing these plants are the early spring and autumn.

They require little water in the winter season; but in the summer frequent waterings are necessary, as two or three in the course of the week.

They afford ornament and variety among other potted plants.

GROVE, a sort of avenue formed by trees of stately growth, disposed in rows, in grass-grounds, gardens, and parks, on or contiguous to spacious lawns, &c. designed for ornament, shade, and shelter. These sorts of walks are much less in estimation at present than formerly.

In extensive gardens or grounds they may be formed in different parts; a large one contiguous to the dwelling, where it may be conspicuous, is often proper, both to effect ornament, and that it may afford convenient shade for occasional walking in the heat of summer; others may be stationed more remote, on the boundaries of lawns or other open spaces of grass-ground, and near garden buildings, such as summer-houses, temples, and other structures; as, wherever they are situated, they always exhibit an air of grandeur, and are great ornaments to spacious gardens. Such gardens are indeed incomplete without one or more of such plantations.

The trees in forming groves are usually disposed in several straight rows, and at such distances as their branches may so far approach each other, as to afford a moderate shade from the summer's sun; yet so distant, that each tree may have full scope to spread its branches all around, so as to exhibit their straight trunks and spreading heads distinct, according to their natural growth, and that a due portion of air and light may be admitted to promote the growth of the grass between and under them, so as to form a close, firm sward, and constant verdure. They are also sometimes formed with the trees placed irregularly, and the spaces between planted with various sorts of shrubs to form un-

derwood, and with serpentine gravel-walks variously winding through the whole. The trees and shrubs that are most proper for this use, are those of the deciduous and evergreen tall-growing kinds, which form handsome heads.

They are distinguished into two sorts, *open groves* and *close groves*.

For the first sort, the handsomest growing ornamental forest-trees with the most spreading heads should be chosen, and disposed in ranges from fifteen to twenty or thirty feet wide, and the same distance between the trees in each row, that each tree may have full scope to form a spreading head, and so as to admit of the growth of grass under them without injury. Where a shady grove is required to be formed as soon as possible, it may be planted contiguous, but distinct from the above, arranging the rows only at ten or fifteen feet distance; by which it will afford shade several years sooner than the other; and, as exhibiting a more dark and gloomy shade, will afford the greater variety in contrast with it. Open groves, chiefly for shade, may also be formed by disposing all the trees irregularly, that they may produce an imitation of a natural grove, and sooner afford a perfect shade and gloominess, which they effect considerably sooner than in straight rows.

The latter sort of groves are formed of large trees, some planted in straight lines, others irregularly disposed, having the ground between them filled with various under-shrubs, and gravel or sand-walks continued through them in winding or serpentine turns; and are sometimes continued round the out-boundaries of pleasure-grounds, parks, &c. as ornamental plantations, and to afford shady and private walking, as well as shelter from the inclemency of cold cutting winds. The various shrubs forming the underwood have a delightful effect in the whole of the walks quite round.

In forming groves in general, it sometimes happens, when gardens or pleasure-grounds are laid out, that large old trees are found growing in a proper situation to constitute a grove, which, if they do not too greatly approach to the habitation, or obstruct any principal prospect or distant view, should be preserved with care; and although they should stand ever so irregularly or close, they may be somewhat regulated by grubbing up the most irregular and ill-formed, or thinning out some, where they form too close a thicket for the design, either for an open or close grove. By proper care in this respect a grove may often be formed in a very short space of time.

GROUNDSEL-TREE. See *BACCHARIS*.
GUAIACUM, a genus comprising plants of the exotic tree kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Gruinales*.

The characters are: that the calyx is a five-leaved perianthium: leaflets ovate-oblong, concave, obtuse, spreading, deciduous: the two outer ones a little smaller: the corolla has five petals, roundish-obovate, obtuse, concave, spreading, longer than the calyx, ending in short claws, inserted into the receptacle: the stamina have subulate filaments, broader at the base, upright, shorter than the corolla, inserted into the receptacle: anthers oblong, finally recurved: the pistillum is a germ, broader above, angular, pedicelled: style short, subulate: stigma simple, acute: the pericarpium has from two to five capsules (five-celled), on very short pedicels, compressed, membranaceous, covered with a pulpy rind, gibbous on the outside, united on the inside, separating when ripe, gaping: the seeds solitary, bony, and oblong.

The species cultivated are: 1. *G. officinale*, Official Guaiacum, or Lignum Vitæ; 2. *G. sanctum*, St. Juan American Lignum Vitæ; 3. *G. Afrum*, African Acute-leaved Guaiacum.

The first, in its native situation, becomes a very large tree, covered with a hard, brittle, brownish bark, not very thick: the wood is firm, solid, and ponderous, appearing very resinous, of a blackish yellow colour within, and of a hot aromatic taste: the smaller branches have an ash-coloured bark. Browne describes it as an evergreen, of a dark gloomy cast, continuing its verdure in the driest seasons, and at times throwing out a great number of blue flowers, which are succeeded by compressed berries of a roundish form. It takes many years to arrive at its full growth.

It is the tree that affords the gum guaiacum, which is obtained by jagging the body of the tree in May. It exudes copiously from the wounds, though gradually; and when a quantity is found accumulated, hardened by exposure to the air and sun, it is gathered, and packed in small kegs. It is a native of the West Indies.

In the second species there are many leaflets placed along the midrib by pairs; they are rounded and obtuse at their ends, but narrow at their base, of the same consistence with those of the first sort, but of a darker green colour. The flowers are produced in loose bunches towards the ends of the branches, of a fine blue colour, and the petals fringed on their edges.

It is sometimes called in the West Indies *Bastard Lignum Vitæ*.

The third has rigid branches: the leaves are alternate, with eight pairs of leaflets: common petiole edged, jointed, channelled; leaflets ovate-oblong, opposite, quite entire, mucronate, smooth, stiffish, perennial, very slightly shortened at the inner base: the stipules pressed close to the branches, subulate, very small. It is a native of the Cape.

Culture.—These plants are capable of being increased by sowing the seeds obtained from their native situations, in pots filled with light earth, plunging them in the hot-bed. When the plants have acquired some growth, they should be carefully removed into other pots, and be well shaded till they have taken fresh root; when they should have a large portion of free air admitted, and be frequently watered when the season is hot and dry, but little in the winter. They must constantly in the winter have the protection of the hot-house, though the third sort will often succeed in a good green-house.

They are propagated with difficulty by layers. They afford variety in collections of the stove and green-house kinds.

GUILANDINA, a genus containing plants of the tree and shrubby exotic kinds.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium (urceolate or pitcher-shaped): tube short, turbinate, permanent, with an oblique mouth: border five-parted, nearly equal, spreading, deciduous: divisions oblong, broader on the outside, and rounded: the two upper ones a little shorter, the lowest a little longer: the corolla has five petals, inserted into the neck of the calyx: the uppermost roundish, concave, ascending, a little shorter; the rest oblong, broader in front, rounded at the tip, reflex-spreading, longer than the calyx, and the two lowest a little longer than the middle ones: the stamina have subulate filaments, thicker at the base, and villose, decumbent, inserted into the neck of the calyx, shorter than the corolla, unequal: the lower ones gradually longer: anthers oblong, affixed to the back: the pistillum is an oblong germ: style filiform, length of the stamens; stigma simple: the pericarpium is a rhomboidal legume, the upper suture convex, from swelling compressed, one-celled, with transverse partitions: the seeds bony, globular-compressed, solitary between the partitions.

The species cultivated are: 1. *G. Bonduc*, Yellow Bonduc, or Nicker-tree; 2. *G. Bonduc*.

cella, Gray Bonduc; 3. *G. Moringa*, Smooth Bonduc; 4. *G. dioica*, Hardy Bonduc.

The first has leaves near a foot and half long, composed of six or seven pairs of pinnæ, each of which has as many pairs of leaflets, which are ovate and entire; the principal midrib of the leaf is armed with short, crooked, single thorns, placed irregularly: the stalks are also armed with thorns, which are larger. The stalks at first grow erect, but afterwards twine about the neighbouring trees and shrubs. The flowers are in long axillary spikes, and of a yellow colour. It is a native of both Indies.

The second species differs from the first in having much smaller leaves, set closer together; and below each pair of leaflets two short stiff crooked spines, which are opposite: the flowers are of a deeper yellow, and the seeds are ash-coloured. It makes a good fence, and is a native of the Indies, &c.

The third is a tree, which has a thick root of a softer substance than usual. Trunk of a middling size, from twelve to twenty feet in height, smooth, with an ash-coloured bark: the branches are rather erect: the leaves bipinnate: common petioles two or three feet long, round, smooth, stiff; the partial ones in five or six pairs, horizontal, compressed: leaflets in three pairs, ternate, oblong, entire, smooth, veined: the flowers in racemes, which are long, axillary, round, pubescent, subdivided, many-flowered; the subdivisions branched, directed one way, bent down; under these are minute deciduous scales. They are of a white or pale red colour. It is a native of the East Indies.

The fourth species has an erect stem, thirty feet high or more, dividing into many branches, covered with a very smooth, blueish, ash-coloured bark: the leaflets are oval, very smooth, and entire, alternate. There are male and female flowers on different plants. It is a native of Canada.

Culture.—The three first sorts are increased by sowing the seeds, which in the two first must be previously well soaked in water, in pots filled with light fresh mould, and plunged in the tan hot-bed. When they have attained a little growth, they should be removed into separate pots, and replaced in the tan-bed, due shade being given. They afterwards require the care of tender exotics, being pretty freely watered in hot weather during the summer; but very sparingly in winter. The third sort must however be very sparingly watered at all times.

The fourth species may be raised by planting the cuttings, or making layers in the spring season. It succeeds best in a light dry soil.

The former are proper for affording variety

among tender stove plants; but the last is so hardy as to succeed in the open ground, in the fore parts of beds, clumps, and borders, in warm dry situations.

GUINEA PEPPER. See CAPSICUM.

GUM, a vegetable disease incident to fruit-trees of the stone kind, distinguished by a morbid exudation of gummy matter from the wounded alburnum, or inner bark. It is supposed by Mr. Forsyth to arise from injudicious pruning, from bruises, or any injuries received in the wood or bark, which may happen from strokes of the hammer in nailing, from pinching the shoots by nailing the shreds too tight, or by driving the nails too close to the branches. And it may be occasioned by leaving the foot-stalks of the fruit, or by pruning in summer, and cutting the shoots to short stumps, and by injuries sustained by a careless application of ladders in nailing and gathering the fruit, &c. but it originates more particularly where large limbs have been lopped or broken off. It may be known before the gum itself makes its appearance, by the bark at first becoming of a brownish colour, and gradually growing darker, till at last the gum begins to ooze out like little blisters. As soon as any of these marks are met with, the infected part should be cut out with a sharp instrument, and the composition and powder applied immediately. In doing this, the gum should be cut out perfectly clean. It may be seen oozing out from between the wood and bark, and must be followed till the white clean bark and wood is arrived at. And afterwards, if any gum should make its appearance, it must be scraped off; which is best done when it is moistened with rain, as it can then be scraped off easily without hurting the bark. This business must be performed without delay; otherwise the disease will advance with rapidity, and greatly injure the trees.

Mr. Forsyth recommends, that when trees are hollow they should be examined carefully, to see whether any grubs have entered the bark and wood, which is known by their perforating the bark: and that where there are any, they should be carefully cut out before the composition is applied to the tree.

It has been suggested by the author of the "Philosophy of Gardening," that this exsudation may perhaps be prevented from continuing to flow, by binding on the part, previously smoothed by a knife, thin sheet lead, such as tea is wrapped in, in such a manner as to prevent the gum from being dissolved by rain or dew, as its hardening prevents the exsudation, and the consequent exhaustion of the tree. A piece of sponge, soft leather, or Indian rub-

ber should be bound on under it till the part is healed. A strong solution of green vitriol in water is likewise supposed capable of being useful, by being applied to the extremities of the exsuding vessels, and thus stimulating them into contraction, and by that means preventing the further discharge of this substance.

The nice application of a piece of fresh bark taken from a similar tree of inferior value, kept on by the elastic pressure of a list bandage, is also suggested as worthy of being made a trial of in the same intention.

HÆM

HÆM

HÆMANTHUS, a genus containing plants of the bulbous-rooted herbaceous flowery perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Spathaceæ*.

The characters are: that the calyx is a six-leaved involucre, very large, bearing an umbelule: leaflets erect, oblong, permanent: the corolla is monopetalous, erect, six-parted: parts erect, linear: tube very short, and angular: the stamina have six subulate filaments, inserted into the tube, and longer than the corolla: the anthers incumbent, oblong: the pistillum is an inferior germ: the style simple, length of the stamens: the stigma simple: the pericarpium is a roundish three-celled berry: the seeds solitary, and three-cornered.

The species cultivated are: 1. *H. coccineus*, Scarlet Hæmanthus, or Blood-flower, or Lily; 2. *H. puniceus*, Waved-leaved Hæmanthus, Blood-flower, or Bastard Dragon; 3. *H. carinatus*, Carinated Cape Hæmanthus.

The first has a large bulbous root, from which in autumn come out two broad flat leaves, of a fleshy consistence, shaped like a tongue, which turn backward on each side, and, spreading flat on the ground, have a singular appearance all the winter; but in the spring they decay. The flowers are produced in autumn, just before the new leaves come out; and are of a bright red colour, in a large cluster, two or three inches from the bulb. It is a native of the Cape.

In the second species the roots are composed of many thick fleshy tubers, forming a head, out of which arises a fleshy spotted stalk, spreading at top into several spear-shaped leaves,

which are waved on their edges. The stalks are a foot high; leaves six or eight inches long, and two broad in the middle. From the side of the stalk near the ground breaks out a strong fleshy scape, six or eight inches long, with a large cluster of yellowish red flowers at top. The berry is obovate, of a fleshy scarlet colour. It is a native of Africa.

The third has a large bulbous root, sending out three or four leaves, a foot long or more, not flat, but hollowed like the keel of a boat, and more erect than those of the first sort, but not quite so broad: the flowers are of a paler red. It is a native of the Cape.

Culture.—The first and third sorts are raised with difficulty, as off-sets are only sparingly afforded. The off-sets, when procured, should be planted in pots of light loamy mould, as soon as the stems decay, placing them in a dry glass case. When thus taken up, the old roots may remain out of the ground till August, and be then new potted, and placed out till they require protection for the winter.

The second sort is increased by parting the roots, and planting them in pots of light loamy earth in the early spring, before they put forth new stems. This is also the period for re-potting the old roots.

They are likewise all capable of being raised from seeds, especially the second sort, by sowing them in pots of light sandy earth, and plunging them in the bark stove. When the plants are up, they should have air admitted pretty freely; when of some growth being removed into separate pots, and replunged in the hot-bed. When hardened properly, they may be placed in the dry stove.

These plants require the management of other

bulbous-rooted plants, little water being given in the winter season, but pretty frequently in warm weather, and when flowering, with also a pretty free allowance of air.

They are all very ornamental in stove collections.

HÆMATOXYLUM, a genus containing a plant of the exotic tree kind for the stove.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium, coloured: tube very short, pitcher-shaped, fleshy, permanent: border five-parted, spreading, deciduous: parts oblong, blunt; the four upper ones equal, the lowest a little longer than the rest: the corolla has five lanceolate petals, broadest at top, blunt, veined, spreading, nearly equal, inserted into the calyx, and larger than its divisions: the stamina have ten subulate filaments, hairy at bottom on the inside, upright, unequal, scarcely longer than the corolla, inserted into the calyx: anthers oval, small: the pistillum is an oblong sabre-shaped, compressed germ: style capillary, bent at the tip, longer than the stamens: stigma funnel-shaped: the pericarpium is a lanceolate legume, flat, blunt, one-celled, edged on each side with a thickish suture that does not open, opening by the bursting of the valves in the middle longitudinally, and dividing into two unequal boat-shaped parts: the seeds few, oblong, compressed, furrowed, and fixed to one of the sutures.

The only species is *H. Campechianum*, Log-wood, Blood-wood, or Campeche-wood.

In its native situation it rises from sixteen to twenty-four feet high. The stem is generally crooked, and seldom thicker than a man's thigh: the inner bark is red, and the wood hard: the branches are subdivided, flexuose, prickly, round, ash-coloured: the leaves pinnate: petioles alternate, patulous, round, smooth; leaflets four pairs, on very short petiolules, generally obcordate, entire, small, veined, very smooth and shining, spreading in the day time, but at night upright, converging: the flowers are peduncled, numerous, small, pale yellow: on short, scattered, simple, coloured peduncles. It is a native of Campeche, flowering in March and April.

Culture.—This plant is increased, by sowing the seeds procured from its native situation, in pots filled with light earth, plunging them in the bark-bed in the stove. When of a few inches growth, they should be removed into separate pots, and be replunged into the hot-bed. By this means they grow rapidly the first year.

They are, however, very tender, requiring the constant protection of the stove, and daily watering.

These plants afford variety in mixture with others of the stove kind.

HALESIA, a genus containing plants of the hardy deciduous flowering shrubby kinds, Carolina Snow-drop Tree.

It belongs to the class and order *Dodecandria Monogynia*, and ranks in the natural order of *Bicornes*.

The characters are: that the calyx is a one-leaved perianthium, very small superior, four-toothed, permanent: the corolla monopetalous, bell-shaped, ventricose; mouth four-lobed, blunt, patulous: the stamina have twelve filaments (seldom sixteen) subulate, upright, a little shorter than the corolla: anthers oblong, blunt, upright: the pistillum is an oblong, inferior germ: style filiform, longer than the corolla: stigma simple: the pericarpium is a corticate nut, oblong, narrowing to both ends, four-cornered, the corners membranaceous, two-celled (drupe four-celled): the seeds solitary.

The species are: 1. *H. tetraptera*, Four-winged Halesia, or Snow-drop Tree; 2. *H. diptera*, Two-winged Halesia.

The first frequently comes up with two or three stems, from fifteen to twenty feet high, sending out branches towards their tops: the leaves are serrate, sharp-pointed, with the middle depressed, growing alternately on short foot-stalks: the flowers hang in small bunches all along the branches, each gem producing from four to eight or nine; they are of a pure snowy whiteness; and as they blow early in the spring, before the leaves appear, and continue for two or three weeks, make a most elegant appearance: they are succeeded by pretty large four-winged fruit, hanging likewise in bunches, and agreeable to the taste. It is a native of South Carolina; flowering in April and May.

In the second species, the leaves are six times the size of the foregoing, not at all tomentose underneath: the fruit mucronate, with two large wings opposite to each other, and two minute ones. It is a native of Georgia.

Culture.—These plants are capable of being raised by seeds and layers. In the first method, the seed should be sown in pots of light earth, placing them in a situation to have the morning sun, or, what is better, in a mild hot-bed. When the plants are up, which is often long in effecting, they should have air pretty freely admitted in order to harden them, but be sparingly watered. They should afterwards be occasionally protected from bad weather, and, when of sufficient hardy growth, be turned out of the pots, and removed into the situations where they are to remain.

The layers of the young shoots may be laid

down either in the autumn or spring, slitting the part laid into the earth. When well rooted in the following autumn, they may be taken off and planted out in the nursery, to remain till of two or three feet growth, when they may be planted out where they are to remain.

These plants are adapted to the borders and clumps of shrubberies and pleasure-grounds.

HALLERIA, a genus containing a plant of the shrubby evergreen kind for the green-house.

It belongs to the class and order *Didynamia Angiosperma*, and ranks in the natural order of *Personateæ*.

The characters are: that the calyx is a one-leaved perianthium, trifid, flat, spreading, very obtuse, permanent: the upper cleft twice as broad as the rest: the corolla is monopetalous, ringent: tube roundish at the base, bent in with a swelling throat: border oblique, upright, four-cleft; the upper cleft a little longer than the others, blunt, emarginate; the side ones shorter, broader, sharper; the lowest very short, very slender, and very sharp: the stamina have four filaments, bristle-shaped, straight, inserted into the tube, longer than the corolla: anthers roundish, twin: the pistillum is an inferior, ovate germ, ending in a style longer than the stamens: stigma simple: the pericarpium is a roundish berry, two-celled: the seeds small, flat, roundish, and winged.

The only species is *H. lucida*, African Fly-Honeysuckle.

It grows to the height of six or eight feet with a woody stem well furnished with branches: the leaves are ovate, serrate, opposite, and continuing green through the year; the flowers come out singly, and are of a red colour; but being intermixed with the leaves, and growing scattering on the branches, are not easily discerned. They come out in June, and the seeds ripen in September. The leaves continue green all the winter. It is native of the Cape; flowering from June to August.

Culture.—This plant may be propagated by cuttings, which should be planted in pots filled with light earth in the summer.

When the plants are up, they may be exposed in the summer, and have plenty of water; and in winter be housed with Myrtles, and other hardy exotic plants, which require much air in mild weather.

They may also be raised by sowing the seeds in pots of light earth, and plunged in the hot-bed, by which means they succeed very well.

They afford variety in green-house collections.

HAMAMELIS, a genus containing a plant of the hardy deciduous shrubby kind.

It belongs to the class and order *Tetrandria*

Digynia, and ranks in the natural order of *Berberides*.

The characters are: that the calyx is a three-leaved involucre, three-flowered: the two inner leaflets roundish, smaller, blunt; the outmost larger, lanceolate: perianthium double: the outer two-leaved, smaller, roundish; the inner four-leaved, upright; the leaflets oblong, blunt, equal: the corolla has four petals, linear, equal, very long, blunt, reflex; nectary of four truncate leaflets, growing to the corolla: the stamina have four filaments, linear, shorter than the calyx: anthers two-horned, bent in: the pistillum is an ovate germ, villose, ending in two styles, which are of the same length with the stamens: stigma capitate: there is no pericarpium: the seed is an ovate nut, half covered with the calyx, blunt, furrowed on both sides at the tip, having two little horns spreading horizontally, two-celled, two-valved.

The only species is *H. virginica*, Witch-Hazel.

It has a woody stem, from two to three feet high, sending out many slender branches: the leaves are oval, indented on their edges, having great resemblance to those of the Hazel, and placed alternately on the branches: these fall away in autumn, and then the flowers come out in clusters from the joints. It is a native of Virginia.

Culture.—This plant is propagated by seed, and layers made from the young branches.

In the first method, the seed procured from America is sown in an easterly border, half an inch deep; the plants come up the second spring, the ground being kept clean from weeds: when the season proves very dry, moderate waterings should also be given in summer; and when they are two years old, they should be transplanted into nursery rows.

The layers should be laid down in autumn, or early in spring, the young twigs of the last summer's shoots being chosen; giving them a slit at a joint, then laying them in the earth. They will be rooted, and fit to transplant into the nursery by the autumn following. When they have had some growth there, they may be removed to the places where they are to remain.

They afford variety in the shrubbery and other parts of pleasure grounds.

HAND-GLASSES, such glasses as are moved by the hand, and used for placing over, protecting, and forwarding various sorts of plants. In winter, such as young cauliflowers, lettuces, &c. and in raising seedling plants of both these in the spring, as well as several others, in hot-beds, or in warm borders; also small sallading. And they are particularly necessary in the culture of general crops of summer cucumbers, for pla-

cing upon the hot-bed ridges made in April and May, and also occasionally for melon-ridges made in the same season to produce a crop of autumnal fruit. In the flower-garden, pleasure-ground, nursery, green-house, &c. they also prove very useful in propagating, raising, and protecting many kinds of curious plants in their young growth.

They may also be employed in raising many of the tenderer or more curious annual flowers, such as African and French marygolds, chrysanthemums, balsams, ten-week stocks, and others of similar kinds, where better contrivances are not at hand. See ANNUAL PLANTS.

They are likewise useful in striking many sorts of small cuttings, pipings, and slips of tender or curious plants, such as myrtles, flowering plants, and other similar kinds.

Hand-glasses are of different kinds and forms. The leaded glasses consist of many small panes of glass worked into lead-work.

They are mostly made square, but sometimes round or octagonal; in all of which, each is formed in an open frame-work of strong window-lead, and sometimes of cast-iron in the same form; but more commonly lead; the lower part being upright, from six to eight or ten inches in depth, and the otherhipped off or sloped on each side, narrowing upward, so as to terminate in a point, as it were, at top, having in that part a fixed erect ring handle of the same material; the glass being laid in lead-work, and the joints well brushed over with proper cement, to render the whole wind and water tight.

They are of different dimensions, from twelve or eighteen inches to two feet wide, or more, to suit different purposes; though for general use in kitchen gardens, about eighteen inches width is the most common, and nearly the same in depth in the whole; but some for particular uses are of smaller sizes, as from six or eight to ten or twelve inches width.

When laid in frames of cast-iron, in putty, they are neat, strong, and durable; but heavy, and much more expensive than leaded glasses.

The bell Hand-Glasses are blown at the glass-houses in different places, and are equally eligible, or superior to the leaded glasses in many cases, especially in kitchen-gardens, particularly for the preservation of plants in winter, such as early crops of cauliflowers to stand the winter, lettuces, &c. as well as for hot-bed ridges of cucumbers and melons, in the summer and autumn crops.

These are in dimensions nearly in proportion to that of the larger sizes of leaded glasses, or rather wider below; made in the bell form, having a rough knob at top serving as a handle; they should be made not too high, but flat and

dome-form above, which is more advantageous in promoting a strong growth, and not so liable to draw up the plants, while they receive the benefit of the sun more effectually.

The leaded glasses are superior in this respect, that when any of the glass-work is broken it can be readily mended or replaced by the glazier; but the bell glasses, when much broken, are nearly useless; though, when they are broken into pieces, they may be joined with a cement of strong white lead, and placed under cover till it is thoroughly dry; and then, with care in handling, they may last a long time. As new bell-glasses are more liable to crack by frost, or too hasty moving them, than older ones seasoned to the weather, in using them the first winter in crops of early cauliflowers, &c. great care should be taken in handling them, in lifting them off and on, or raising one side occasionally for the admission of air: the seasoned old sound glasses are in this respect more valuable than the new ones.

The leaded glasses should have wooden frames at the bottom part to rest upon, otherwise they are soon destroyed by their constant contact with the earth.

HARD-BEAM TREE. See CARPINUS.

HARE-BELLS. See HYACINTHUS.

HARE's-EAR. See BUPLEURUM.

HAWTHORN. See CRATÆGUS.

HAZEL-NUT-TREE. See CORYLUS.

HEATH. See ERICA.

HEART's EASE. See VIOLA.

HEDERA, a genus containing plants of the shrubby, climbing, evergreen, and deciduous kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Hederaceæ*.

The characters are: that the calyx is an involucre of a simple umbel, very small, many-toothed: perianthium very small, five-toothed, surrounding the gerin: the corolla has five petals, oblong, spreading, with the tips bowed inwards: the stamina have five subulate filaments, upright, of the same length with the corolla: anthers trifid at the base, incumbent: the pistillum is a turbinate germ, surrounded by the receptacle: style simple, very short: stigma simple: the pericarpium is a globular berry, one-celled (five-celled): the seeds five, large, gibbous on one side, angular on the other.

The species are: 1. *H. Helix*, Common Ivy; 2. *H. capitata*, Cluster-flowered Ivy; 3. *H. quinquefolia*, Five-leaved Ivy.

The first is a parasitical shrub, which by the support of walls, buildings, or trees, rises to a very great height, insinuating itself by a great abundance of fibres into the joints of walls, or

the bark of trees. If no support is near, the stalks trail upon the ground, taking root their whole length, so that they cover the surface closely, and are difficult to eradicate; for, where any small parts of the stalks are left, they will soon spread and multiply. Whilst Ivy is fixed to any support, or trails upon the ground, the stalks are slender and flexible; but when it has reached to the top of its support, they shorten and become woody, forming themselves into large bushy heads; their leaves are larger, more of an oval shape, and not divided into lobes like the lower leaves. While the stalks trail, Ivy does not produce any flowers; and in this state is called *Barren* or *Creeping Ivy*: but when the branches get above their support, they produce flowers at the end of every shoot; these are succeeded by berries, formed into round bunches, and turning black before they are ripe. In this state it is called *Climbing* or *Berried Ivy*. The trunk, in old trees, is covered with an ash-coloured chopped bark; in the young branches it is of a green or purple colour. The leaves are alternate, evergreen, glossy, smooth, while the plant creeps, three-lobed, or sometimes five-lobed; but when it quits its support, ovate: they are sometimes tinged with red, sometimes painted with white veins, particularly in the young branches: the petioles are long, and dilated at the base: the flowers are yellowish, or greenish white, in a very close, thick umbel, at the extremities of the twigs: the berry is placed below the receptacle of the flower. It is found wild all over Europe.

It is observed by Mr. Curtis, that few are acquainted with the beauty of Ivy when suffered to run up a stake, and at length to form itself into a standard; the singular complication of its branches, and the vivid hue of its leaves, give it, he says, one of the first places amongst ever-greens in a shrubbery.

There are varieties with silver-striped leaves, and with yellowish leaves on the tops of the branches.

The second species has the stem arborescent, eight feet high in the stove, erect, cylindrical, abruptly branched. The bark brown, a little cracked. The branches curved upwards, leafy, terminated by flowers. The leaves scattered, more crowded towards the tops of the branches, on foot-stalks, wide spreading, pointed, waved on the margin, very smooth, obscurely three-nerved, veiny, bright green. The foot-stalks various in length, nearly cylindrical, smooth, firmly fixed to the branch by an enlarged triangular base. Buds consisting of several large, roundish, smooth, yellowish scales, soon falling off, which are often tipped with the rudiments

of a leaf, and appear like abortive leaves. Racemes erect, branches generally alternate, ending in little round heads of many sessile flowers. The flowers numerous, white, so small that the structure is not readily to be understood. It is a native of Martinico.

The third has long slender shrubby rooting stems, climbing upon support to a very great height, by their fixing themselves in the walls as they advance. The leaves are quinque-foliate and deciduous, being composed of five oval, serrated lobes, closely covering the stems and branches, changing in the autumn to a reddish cast.

It has been chiefly employed to cover walls or high buildings, which it does in a short time, as it will shoot almost twenty feet in one year; but as the leaves fall off in autumn, and are late before they come out in the spring, it is not much esteemed. As it is not injured by smoke, or closeness of air, it is proper to cover buildings in great towns. It is a native of America.

Culture.—All these plants are readily increased by their trailing branches, which throw out roots their whole length.

They may also be raised by planting cuttings of the young branches in the autumn, on a shady border, which, when they have stricken root, should in the following autumn be removed to where they are to remain.

They are likewise capable of being procured by sowing the seed when perfectly ripe in the early spring, in a moist shady situation.

In training them against walls, &c. it is only necessary to direct a few of the branches at first, as they soon attach themselves to them.

These plants are capable of being employed by way of ornament in various situations.

HEDGE, a sort of fence employed occasionally both for use and ornament in gardens, as for inclosing and dividing the internal parts of the ground.

Fences of this sort are of two kinds, dead and living; but it is only the latter sort that is made use of in gardens. They are the cheapest and most ornamental that can be employed where walls, &c. are not necessary for wall-trees.

There are a great variety of shrub- and tree-plants, both of the deciduous and evergreen kinds, that may be occasionally employed for hedges; the principal of which are, in the first sort—White-thorn, Black-thorn, Crab-tree, Alder, Elder, Poplar, Willow, Hornbeam, Beech, Elm, Lime, Privet, Berberry, Sweet-brier, Rose, Syringa, and Honey-suckle.

In the latter kind—Holly, Yew, Furze, Lati-

ref, Laurustinus, Phillyrea, Alaternus, Box, Evergreen Oak, Evergreen Privet, Juniper, Virginia Cedar, Savin, Rosemary, Pyracantha, and Sea Purslain Shrub, &c.

Outside Hedges.—For this purpose the White-thorn plant forms the best, which, by being properly trained, by trimming or clipping annually, is rendered quite close, hardy, and durable.

Hedges of this sort are formed by planting young plants or sets raised from seed in the nursery, which when a year or two old, or as big as a goose-quill, up to the size of the little finger, are proper for this use. See CRATÆGUS.

The Black or Sloe-thorn is also proper for Hedges, and forms a very strong durable fence; but by its producing such abundance of suckers from the root, it is less esteemed; and as it is well armed with thorns, and of quick growth, it may be useful where the White-thorn cannot be procured.

Hedges of this nature may be raised by sowing or setting the seed or sloes in autumn, when fully ripened, in one or two small drills or trenches, where the hedge is to be, at the distance of five or six inches or more from each other, and to the depth of two or three inches. Where there are two rows, they may be about six or eight inches apart.

But it is a better method to first raise the plants in the nursery till of a proper size, as two years old, and then plant them out in rows as above.

The Crab-tree, of the apple, as well as thorny sort, are sometimes planted for Hedges; but the plants for this purpose should be such as are raised from the kernels of the wild crabs, which come up more thorny than those of the cultivated kinds, and shoot more branchy and close, quite from the bottom. These should, however, only be made use of as being of quick growth, and where the others cannot be procured.

Hedges of these may either be raised by sowing the kernels of the fruit in autumn or winter, in the place where the Hedge is intended, in drills the whole length, an inch deep, covering them that depth with earth; or the plants raised first from seed in the nursery, which, when a year or two old, may be planted out. Some plants of the Hedge may, in this case, be suffered to grow up, and afford an annual crop of crabs for verjuice. A proper number of the plants may likewise be used, as they stand in the Hedge, for stocks, to graft on with useful family or cyder apples.

The Elder plant is also used for outward Hedges where a fence is wanted as soon as pos-

sible, as being very expeditious in its growth, though not the most beautiful. Hedges are readily formed by planting large truncheons, or cuttings of the straightest upright shoots and branches, from two or three to six feet long, planted either upright a foot distance, and watted along the top to preserve them firm and even; or placed slanting across one another chequer-wise, forming a sort of lattice-work, which is the most effectual method. In either way of planting, the lower ends of the cuttings must be sharpened, making holes to receive them fifteen or eighteen inches deep, either in the level ground, or the sides or tops of the banks.

The Alder is also proper to plant for Hedges in wet or marshy ground, as being an aquatic, and growing readily by small or large cuttings like the Elder.

It is very proper on the borders of rivers, brooks, or other waters, as its roots, and numerous suckers arising from their lower parts, form such a close thicket as effectually to preserve the earth of the banks from being undermined and washed down.

The Lombardy Poplar, as emitting numerous side-branches quite from the bottom, and being of very quick growth, is also occasionally employed to form an expeditious outward Hedge along the side or top of a bank or ditch, or to train as a loftier Hedge for shelter, shade, blind, &c.

Hedges of this plant are formed at once, if wanted, of five or six feet or more in height, by having young trees, well branched from the bottom, heading the top to the above height, and planting them in a single row a foot or two asunder. Younger sets of two or three feet in height may be planted and trained. When designed as an outward Hedge, they should generally have an outside ditch. They may be kept to an orderly thick growth, by proper clipping in the summer season.

The Willow is also sometimes planted to form outward Hedges along the sides of watery ditches, brooks, rivulets, &c. or any marshy or moist situation. They are planted either by small cuttings, or larger long sets of several feet, and inserted in the manner directed for the elder cuttings, so as to form an immediate Hedge. In either method they run up quickly, and may be kept close and regular by proper cutting in the summer season.

The Holly forms an excellent and beautiful Hedge. It is the best evergreen Hedge that can be planted for an outward fence, as it grows close, and is well furnished with leaves, which being armed with thorns, no cattle browse upon them; and being always in foliage, it affords

good shelter in winter, and is ornamental at all seasons. The only objection to it is, its slowness of growth the first four or five years.

Hedges of this sort are formed either by sowing the seeds at once in the places where the Hedges are to be, in drills an inch and half deep; or by planting young plants of two or three years old from the nursery: this is rather the best practice. They may be planted in one or two rows: though two rows planted a foot asunder, and the same distance in each row, form the thickest and most effectual hedge. They may be kept in order by clipping once or twice a year.

Yew is occasionally used as a boundary Hedge, and when full grown is very thick and close.

These Hedges should be guarded by a ditch or bank on the outside. They are best raised by setting the young plants.

The Furze plant is sometimes used for an outward evergreen Hedge, but which makes only an indifferent one, being apt to die off in gaps. As it grows well upon dry banks, or any poor dry soil, it may be used for a Hedge in such cases: these are raised by sowing the seeds in autumn at once in the place where it is designed to have the hedge, in drills an inch and a half deep.

In the general management of these Hedges it may be observed that all outward ones, designed as fences, should have a ditch and bank; the ditch, &c. serving as a defence to the young Hedge against cattle, &c. till it is grown up, and afterwards rendering the whole a more effectual outward fence. When planted on the level ground, they should be defended with railings, open pales, hurdles, or a stake and bush dead hedge, till advanced to the above growth. Where a ditch and bank is intended, the ditch on the outside should be three feet wide at top, two or three deep, sloping to one wide at bottom; raising a low bank on the inside on which to set the plants, which may be planted either on the side of the inner bank, in two rows one above the other, a foot asunder, as commonly practised for quick Hedges, putting them in in forming the ditch and bank; or be planted entirely on the top of the bank, first forming the ditch and bank, and levelling the top so as to form a sort of border or bed extending longways, planting the sets in one or two rows the whole length; but two rows a foot asunder is the most eligible for all outward fences, as they always form the thickest, strongest, and most effectual Hedge-fences.

In whichever way the planting is performed, the roots of the sets should always be bedded in,

in the finest loose mellow mould that can be procured. With this care large plants will succeed in the most perfect manner.

Division Hedges.—When Hedges are designed for middle fences to divide grounds, two sided banks are raised a yard high, and as broad at top, having a slight ditch on each side, and each side of the bank formed with square spit-turfs from the adjoining ground, and the middle filled up with mould from the ditches on each side; so that, when finished, it forms a yard-wide bed all the way on the top. Along the middle of these, plant two rows of hedge-sets, or sow the seed in drills as has been directed.

But where no ditch or raised bank is required, the place for the Hedge should be marked out on the level ground, two or three feet broad, digging it along one or two good spades deep. The sets should then be planted in one or two rows, ranging along the middle; or the seeds sown at once where it is intended to have the Hedge, in two drills, a foot asunder, the whole length. For interior garden Hedges one row is generally sufficient, either of sets planted or seeds sown. In this mode, where the sets are of a tolerably large size and strength, it will be proper to form a trench, in which to plant each row, with the roots all a regular depth, and the tops upright; or, if quite small young sets, they may be planted with a dibble.

In the first method, one or two narrow trenches should be formed longways, for a single or double row of sets, with the spade, by cutting out a narrow trench six or eight inches deep all along, for each row of plants, making one side upright; then the sets should be placed in the trench close against the upright side, six, eight, or ten inches asunder in the row, with their tops all upright, several inches above ground; and turn in the earth directly upon the roots, &c. to the depth of the trench, treading the earth there to moderately firm, to fix the plants in the proper position as the work proceeds;—and if intended to plant two rows of sets to form a double Hedge, make another trench a foot distance from the first, and plant the sets in the same manner and distance; placing those of the second trench opposite the interval spaces of the first row of sets, earthing them in regularly as the others, and treading it down close to the sets, evenly along the surface.

In trench-planting, the sets may likewise be put in, by planting them as you proceed in digging the trench; marking out with the spade a foot-wide trench, digging out a spade depth of earth at one end, the width of the trench, then placing a set therein close to one side; or, if intended to have a double Hedge, placing two

sets, one to each side of the trench; and then, in either method, proceeding in digging, turning one or two spades of earth in upon the roots of the sets; and at eight or ten inches from these, plant one or two sets more in the same order, digging and earthing them in as the others; and thus proceed, digging along and planting the row of sets as the work advances; observing in double rows to place the sets opposite to the intervals in the rows of each other.

In planting with the dibble, the ground should be previously well dug over a spade deep; then trimming the straggling roots and tops of the plants, with the dibble make a hole for each set at the above distances, inserting the roots a proper depth, and close the earth well about each set, as planted.

In forming Hedges by sowing the seeds at once in the intended places for the plants to remain, the ground should be properly dug, and then either one drill for a single row, or two for a double Hedge, should be formed, a foot asunder, sowing the seed tolerably thick in them, and covering it an inch or two in depth with the earth. The place should be kept very clear from weeds, both before and after the plants appear; and if the plants are any where too thick, they may be thinned out at the proper season.

All such Hedges as are exposed to cattle, must, as soon as planted, be protected either with a stake and bush Hedge, hurdles, or rails, for four or five years, till they grow up. They should also be duly hoed and weeded while young, and kept very well cleared from all sorts of weeds. This should be particularly attended to the first two years.

And where designed to be trained, they should be annually clipped over in summer, being topped sparingly while young, only just trimming off the tops of the straggling and run-away shoots, to preserve a little regularity, that the whole may advance equally, and promote lateral wood to thicken them as they advance; and cut in moderately on the sides. But when arrived at nearly their proper height; as four, five, or six feet, or more, they may be trimmed in close on the sides and top annually, to preserve them thick and within their proper bounds, cutting the sides always first as even as possible; then the tops, which should also be cut as even as a line; always cutting in nearly to the old wood of the former year's clipping, otherwise the Hedges will get too broad; the tops being always kept narrower than the bottoms.

The neatest mode of cutting them at the tops is that of the ridge form.

Regular Hedges were formerly in great request in gardens: almost all the different com-

partments and divisions of pleasure-grounds were surrounded with them, of various sorts of trees and shrubs, both evergreens and deciduous, which being neatly trained and clipped once or twice annually, sometimes appeared very ornamental; but from their surrounding, shutting out, and obstructing the sight of the different shrubby borders, clumps, and other parts, as well as their concealing the grounds, and appearing stiff and formal, they are at present little in use. They are only introduced occasionally, either as outward or division fences, or for shelter, shade, &c. in particular compartments, and to cover unsightly objects.

The hedges formed of lofty elm, lime, beech, and some other sorts of deciduous trees, in pleasure-grounds, for ornamental training, are also laid aside, as being stiff, awkward, and troublesome in keeping in order.

The various fancy devices in hedge-work have likewise given way to a better and more easy rural taste.

In addition to what has been said on hedges formed of the more common sorts of plants, it may be observed, that the laurel, though a singularly beautiful evergreen, adorned with a noble large foliage, forming vigorous shoots, never grows so compact, or is so easily kept in form as some other sorts; besides, its leaves being very large, when clipped with shears, they are unavoidably cut through, and so stubbed and mangled as to have a disagreeable appearance. In these hedges, therefore, instead of performing their annual training with shears, the shoots should be trimmed off with a knife, to preserve the leaves entire. This plant is proper to train Hedge-fashion to hide any disagreeable fence, and will grow either under trees, in the shade, or in an open exposure, and is of quick growth.

Hedges of it should be planted in one row, at from eighteen inches to three feet distance, according to the size of the plants at the time of planting them out.

The Laurustinus, from its being not only an evergreen, but a beautiful flowering shrub, forms a delightful Hedge for ornament, as it is covered with flowers in winter and spring. It is also well adapted for training hedge-fashion against any shabby fence or naked wall. In either method, it should be planted in one row, at from eighteen inches to three feet distance.

The Phillyrea and Alaternus, being beautiful evergreens, form very ornamental Hedges. They greatly resemble each other; but the phillyrea being the strongest grower, as well as thickest shooter, is the more proper for a hedge: for variety both may be used: they are also good evergreen shrubs for training hedge-fashion

against unsightly or naked walls, or paling fences, as they soon cover them; and if the common green and variegated kinds are intermixed, in either mode of hedge-work, they have a delightful effect.

They should be planted in one row, at from about fifteen or eighteen inches to two or three feet distance between plant and plant.

The Bay is also capable of forming a tolerable evergreen Hedge for variety, and may be led up six or seven feet high; placing the plants half a yard distance.

The Evergreen Oak is likewise a proper plant to form a tall Hedge, as it may be trained fifteen or twenty feet high, if required. It should be planted in one row, setting the plants one, two, or three feet asunder, according to their size or strength.

The Evergreen Privet will also form a handsome good Hedge five or six feet high, by planting the sets a foot asunder, and training it up narrow at top.

The Tree-box makes a very close and beautiful low evergreen hedge, four or five feet high, when the sets are planted about a foot asunder.

The lesser sorts of Evergreens are sometimes employed for variety to form moderate Hedges, from about three or four to five or six feet in height; they should be planted in a row at from twelve or eighteen inches to two feet asunder.

All the sorts of Evergreens are proper for Hedges, when from about twelve or eighteen inches to two or three feet in height; though the Holly succeeds better when planted in its younger growth.

The proper season for planting them is either in autumn or in spring; for it is not safe to transplant evergreens in the middle of winter. Where the soil is moist the latter is the best period; but in dry gravelly soils, the former.

In planting these sorts of evergreens, for middle or internal Hedges, no ditches or banks are necessary as for outward Hedges for fences; so that, in the place where the Hedge is designed, a sort of border should be marked out the whole length, two or three feet wide, and dug or trenched over for the reception of the plants: the plants need only, in these cases, be planted in a single row.

Among the deciduous plants, the Hornbeam forms a beautiful summer Hedge; being a moderate but very close shooter, well furnished with leaves, and capable of being trained up from about six or eight to twelve or fifteen feet high; but the leaves, though they wither in autumn, remaining firmly attached to the branches all winter, make but a shabby appearance at that season. It is, however, on this account superior to most other deciduous Hedges

for the purpose of forming shelter in the winter. For Hedges, it should be planted in single rows, at about half a yard asunder in the plants, to form a close moderate hedge as soon as possible; but if designed to be brought up pretty tall, and the plants are spreading, they should be set about three feet distant.

The Beech also forms a close regular Hedge, from about six or eight to fifteen or twenty feet high: the leaves withering on the branches in autumn, continue dropping off most part of the winter. These plants should be planted in the same manner as the Hornbeam.

The Elm forms a close, even, and beautiful Hedge, and may be trained from six or eight, to ten, twenty, or thirty feet high, forming a close fence from bottom to top. The plants for this purpose may be from three or four, to eight or ten feet or more in height, and should be planted in a single row from two or three, to six or eight feet distant, according as they are less or more spreading, and as wanted to form a close Hedge as soon as possible.

The Lime-tree is sometimes employed for ornamental Hedges for variety, but is much inferior to the other deciduous sorts, as it becomes thin and shabby by clipping, and is thinly leaved.

Other low kinds of shrubs of this sort are sometimes employed for variety: some sorts, such as roses, honeysuckles, and syringas, when formed into low Hedges, besides their property as Hedges, produce great quantities of flowers, and afford a fine fragrance.

The plants for this use are of a proper size when from about one foot to a yard in height, according to the sorts. It is best to plant them young, choosing such as are well furnished with plenty of side or lateral shoots, that they may form a close hedge quite from the bottom. They may all be planted either in autumn or early spring, in open weather.

The method of planting them is nearly the same as in the evergreen kinds.

These sorts of Hedges should be trained and clipped in the same manner as directed above.

In order to keep Hedges in perfect good order, they should be clipped twice every summer: the first time about midsummer, when they have made their summer shoot; and the second clipping towards the middle or latter end of August. But when this is done only once in the summer, the clipping should not be performed until the beginning of August, as when cut sooner they shoot again, and appear almost as rough the remainder of the summer, and all winter, as if it had not been done at all.

HEDGE-CLIPPING MACHINE, a sort of machine-scaffolding, or stage, ten, twenty, or thirty feet high, or more, with platforms at dif-

ferent heights, to stand upon, the whole being made to move along upon four low wheels. It is composed of four long poles for uprights, well framed together, eight or ten feet wide at bottom, narrowing gradually to four or five at top, having a platform or stage fixed at every seven or eight feet height, with one near the top, each having a rail waist-high: there is a sort of ladder formed on one side to ascend by, &c. Upon this machine a man or two may be employed on each stage or platform, trimming the hedge with shears, and sometimes with a light garden hedge bill fixed on a handle from three to five or six feet long, which is more expeditious, though it will not make so neat work as cutting with shears. It is very useful in clipping high hedges or trees. And it may be employed for dressing, cleaning, pruning, and nailing different sorts of trees, as well as various other purposes. In extensive pleasure-grounds and gardens they are essentially necessary.

HEDYSARUM, a genus containing plants of the herbaceous flowering kind.

It belongs to the class and order *Diadelphia Decandria*, and ranks in the natural order of *Papilionaceæ*.

The characters are: that the calyx is a one-leaved perianthium, half-five-cleft: clefts subulate, upright, permanent: the corolla is papilionaceous, streaked: banner reflex-compressed, ovate-oblong, emarginate, long: wings oblong, narrower than the other petals, straight: keel straight, compressed, broader outwardly, transversely blunt, from the base to the swelling part bifid: the stamina have diadelphous filaments, (simple and nine-cleft,) bent in at a right angle: anthers roundish, compressed: the pistillum is a slender germ, compressed, linear: style subulate, bent in with the stamens: stigma very simple: the pericarpium is a legume with roundish, compressed joints, two-valved, and containing one seed: the seed kidney-shaped and solitary.

The species chiefly cultivated are: 1. *H. Alhagi*, Prickly Hedysarum; 2. *H. Canadense*, Canadian Hedysarum; 3. *H. gyrans*, Sensitive Hedysarum; 4. *H. coronarium*, Common Hedysarum, or French Honeysuckle; 5. *H. flexuosum*, Waved-podded Hedysarum; 6. *H. humile*, Dwarf Hedysarum; 7. *H. spinosissimum*, Prickly Hedysarum.

The first has the stems shrubby, about three feet high, branching out on every side: the leaves are shaped like those of broad-leaved Knot-grass, very smooth, of a pale green colour, on short foot-stalks. Under these come out thorns, near an inch long, of a reddish brown colour. The flowers come out from the side of the branches in small clusters, are of a

purple colour in the middle, and reddish about the rims. It is a native of the Levant.

The second species is an upright plant, and mostly smooth: the stem streaked and angular: the leaflets are lanceolate: the stipules awl-shaped. It is perennial, and a native of Virginia, &c., flowering in July and August.

The third has a branching perennial root (biennial, annual): the stem shrubby, three feet high, wand-like, upright, very smooth, round, without knots: the leaves are alternate, petioled, hanging down or spreading, often vertical, sometimes simple but usually ternate, especially in adult plants: the middle leaflet lanceolate, long, flat, quite entire, very smooth, veined; the side ones very small, and seeming rather to be appendices than leaflets; they are on short petioles, which are remarkable for a motion peculiar to them. The flowers many and nodding. It is a native of Bengal.

The fourth species has a biennial root: the stems from two to three feet high, hollow, smooth, and branching: the leaves are composed of five or six pairs of oval leaflets, terminated by an odd one: they are alternate, and from the angles which they form with the stem and branches, peduncles come out five or six inches in length, sustaining spikes of beautiful red flowers, which open in June and July, and perfect seeds in September. It is a native of Spain, &c.

There is a variety with white flowers.

The fifth species is annual, and has some resemblance to the foregoing, but is much smaller: the stalks rise near a foot high, and the leaves are composed of two or three pairs of ovate leaflets, terminated by an odd one: the flowers come out in spikes at the top of the stalks, and are of a pale red, intermixed with a little blue. They appear in July, and are succeeded by jointed pods. It is a native of the Levant.

The sixth has a perennial root: the stems half a foot in length, usually with one branch and leaf only: the leaflets obovate-oblong, villous underneath: the spike ovate. It is a native of the South of France, &c., flowering in July and August.

The seventh is an annual plant: the leaflets four or five pairs, with an odd one, narrow and oblong: the stem terminated by small spikes of purple flowers, which are succeeded by small rough legumes. It is a native of Spain, &c.

Culture.—All these plants are capable of being raised by sowing the seeds in the early spring.

In the first sort they should be sown in pots of light earth, and plunged in a moderate hot-bed. When the plants are of some growth they should be removed into separate pots, and be replunged into a very moderate hot-bed, being

properly shaded till they are well rooted. They should afterwards be gradually inured to the open air, being protected in winter as there may be occasion.

The seeds are often long in coming up.

In the second sort the seed may be sown in the early spring, as April, on a bed of light fresh earth, or where they are to remain. In the first case they should be removed where they are to grow in the autumn. These plants should not be often removed afterwards.

The third sort is raised in the same manner as the first, and should have free air in the summer, and be protected occasionally in the winter.

The other sorts are all increased in the same manner as the second, being pricked out while young, and in the autumn removed to the places where they are to grow and flower.

As the biennial sorts either decay or dwindle after flowering, they should be raised in fresh supplies every year from seed.

These plants are very ornamental in the beds, borders, clumps, and other parts of pleasure-grounds, and some of them among other potted plants.

HELIANTHUS, a genus containing plants of the hardy herbaceous flowery kinds.

It belongs to the class and order *Syngenesia Polygamia Frustranea*, and ranks in the natural order of *Compositæ Oppositifoliæ*.

The characters are: that the calyx is common imbricate, somewhat squarrose, expanded; scales oblong, broadish at the base, gaping every where at the tips: the corolla compound radiate: corollets hermaphrodite, very numerous in the disk: females fewer, much longer in the ray: proper of the hermaphrodites cylindric, shorter than the common calyx, bellying at the base, orbicular, depressed: border five-toothed, sharp, spreading: of the females ligular, lanceolate, quite entire, very long: the stamina in the hermaphrodites consist of five filaments, curved, inserted below the belly of the corollet, the length of the tube: anther cylindric, tubular: the pistillum in the hermaphrodites is an oblong germ: style filiform, length of the corollet: stigma two-parted, reflex: in the females, germ very small: style and stigma none: there is no pericarpium: unchanged calyx: seeds in the hermaphrodites solitary, oblong, blunt, four-cornered, compressed at the opposite angles; the inner ones narrower, crowned with two lanceolate, acute deciduous chaffs; in the females none: the receptacle chaffy, large, flat: chaffs lanceolate, acute, two separating each seed, deciduous.

The species cultivated are: 1. *H. annuus*, Annual Sun-flower; 2. *H. indicus*, Dwarf Annual Sun-flower; 3. *H. multiflorus*, Perennial

Sun-flower; 4. *H. tuberosus*, Tuberous-rooted Sun-flower, or Jerusalem Artichoke.

There are several other species of the perennial sort that may be cultivated.

The first has an annual root: the stem single or branched, from five or six to ten or fourteen feet in height, and in hot climates twenty or more; when vigorous, the size of a man's arm: the leaves are alternate, a span or a span and a half in length, and almost as much in breadth, rough, serrate, acuminate, hanging down at the end, on long petioles: the flower single (sometimes several), nodding, a foot or more in diameter. It is a native of Mexico, flowering from June to October. Martyn observes, that as to its turning with the sun, it is a vulgar error; Gerarde could never observe it; and he has seen four flowers on the same stem pointing to the four cardinal points.

There are varieties with double flowers, deep yellow, and sulphur-coloured.

The second species is perhaps only a variety of the first, though constant; but the leaves are convex above in the disk, and of a darker green. The peduncles are less thickened at top, or rather of an equal thickness every where, whence the flowers nod less. The scales of the calyx, except the inmost row, grow out into petioled pendulous leaflets. It grows only from eighteen inches to three feet in height. It probably comes from Mexico or Peru.

The third has the stem and peduncles scabrous: the leaves cordate-ovate: the calyxes loosely imbricate, neither squarrose nor drooping, consisting of forty to fifty scales: the stems many, upright, from five or six feet to eight or nine in height, branching, the stem and each branch terminated by a flower, the principal one sometimes nine or ten inches in diameter, the lateral ones gradually smaller: the leaves some opposite, others alternate. There is a constant succession of flowers from July to November.—It is a native of Virginia.

In the fourth species the stems are several, rough, hairy, streaked, from eight, ten, or twelve to sixteen feet in height, the size of a child's arm: the leaves alternate, light green, rough, pointed, eight inches broad, and ten or eleven inches long, deeply serrate, smaller towards the top: the branches many, long, from bottom to top: the flowers terminating, small; florets in the ray twelve or thirteen. These seldom blow before October, and in some seasons they do not expand at all. The seeds never ripen here: the roots creeping, with many tubers clustered together, thirty, forty, or fifty from one plant, measuring a peck, or in good soils half a bushel; they are, like the common potatoe, red on the outside, and very irregular

in their shape, the size of a man's fist in the largest. It is a native of Brazil.

Culture.—All these flowery plants are easily increased, the two first sorts by seeds, and the others by dividing their roots.

The seeds should be sown in the early spring months, in the places where the plants are to grow and flower, in patches of three or four seeds together. When the plants are up they may be thinned out to one or two of the best.

They may be had more forward by sowing them on a moderate hot-bed, under glasses, and afterwards transplanting them to the situations where they are to grow.

The divided roots may be planted out in the places where they are to remain, either in the autumn or the early spring months.

These plants produce a fine ornamental effect in the back parts of the borders, clumps, and other parts of pleasure-grounds, and by sowing at different times may be kept in flower for a considerable length of time.

In the perennial sorts the decayed stems should be cleared away when they begin to decline. They continue long.

The last, or tuberous-rooted sort, is increased by planting the smaller roots, or the larger ones cut in pieces, a bud being preserved to each, either in the spring or autumn, allowing a good distance, as the roots multiply greatly. In the autumn following, when the stems decay, the roots may be taken up for use.

When cultivated for a crop, the sets should be planted in an open part of the kitchen-garden, in rows three feet or more asunder, and at least eighteen inches distant from each other, to the depth of four or five inches. The best time is the latter end of March, in a light soil. The roots may be taken up for use in September, and the whole crop housed in October. When kept in sand in a dry place, they continue the whole winter very good.

HELICONIA, a genus containing a plant of the tall herbaceous perennial kind, for the stove.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Scitamineæ*.

The characters are: that the calyx consists of common and partial spathes, alternate, distinct, with hermaphrodite flowers: there is no perianth: the corolla has three petals, oblong, channelled, erect, acute, equal: nectary two-leaved; one leaflet nearly equal to the petals; the other very short, channelled, hooked, opposite: the stamens consist of five (or six) filaments, filiform: anthers long, erect: the pistillum is an inferior oblong germ: style shorter than the stamens: stigma long, slender, curved, with a terminating head: the pericarpium is an oblong

capsule, truncate, three-sided, three-celled: seeds solitary, oblong.

The species is *H. Bihai*, Bastard or Wild Plantain.

It is a large herbaceous plant, from ten to twelve feet in height: the leaves oblong, narrower at both ends, entire, marked with parallel lines, erect, thick, and very smooth. Petioles the length of the leaves or more, round, thick, channelled above. Scape upright, the length of the petioles, round, thick, smooth: spadix simple, upright: common spathes several (eight to ten), rigid, cordate, embracing, from erect, spreading, acuminate, distich, yellowish brown: the flowers are in bundles concealed within each spathe: partial spathes membranaceous, whitish, the length of the flowers, which are distinct, subsessile, pale or greenish yellow. It is a native of the West Indies, flowering in spring.

Culture.—These plants are increased by suckers arising from the root, particularly after having fruited, which may be taken off any time in summer, with fibres to them, planted in pots, and plunged in the bark-bed, where they will readily grow, and afterwards shifted into larger pots as they advance in height.

They afford variety among other stove-plants. **HELICTERES**, a genus containing plants of the shrubby exotic kind, for the stove.

It belongs to the class and order *Gynandria Decandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved perianthium, tubulous, half-ovate, obliquely spreading, unequally five-cleft, coriaceous: the corolla has five petals, oblong, equal in breadth, fixed to the receptacle, longer than the calyx: claws long, with a tooth on each side at the base: nectary of five petal-shaped, lanceolate, very small leaflets, covering the germ: the stamens have five, ten, or more filaments, very short: anthers oblong, lateral: the pistillum is a filiform receptacle, very long, bowed back, bearing an ovate germ at the tip: style subulate, longer than the germ: stigma subquincifid: the pericarpium consists of five capsules, often twisted spirally, one-celled: the seeds very many and angular.

The species cultivated are: 1. *H. baruaensis*, Small-fruited Screw-tree; 2. *H. isora*, Great-fruited Screw-tree.

The first is an upright tree, about twelve feet in height, branching but little. The younger branches, peduncles, and petioles are tomentose: the leaves acute, wrinkled, tomentose, and whitish underneath, somewhat hairy on the upper surface, petioled, alternate, deciduous: the stipules awl-shaped: the peduncles many-flowered, terminating, thick: about the pedicels are

large, depressed, green glands, uncertain in number, black when dried. The flowers have no scent. It is a native of the island of Barú.

The second species is likewise a small upright tree, about twelve feet high, branching but little: the younger branches, peduncles, calyxes, and leaves tomentose: the leaves petioled, alternate, acute: the stipules in pairs, bristle-shaped: the peduncles many-flowered, terminating, glandular. It is a native of Jamaica, flowering here in June and July.

Culture.—In these plants the increase is effected by seeds, which must be sown upon a hot-bed in the spring, and when the plants are come up sufficiently strong, they should be each planted in a separate small pot filled with light earth, being plunged into a moderate hot-bed of tan, due shade from the sun being given till they have taken new root. They should afterwards be treated in the same way as other tender shrubs, raising the glasses every day in proportion to the weather, that they may have fresh air. In summer the plants should remain under the frames, if there is sufficient height; but in autumn be replunged into the tan-bed in the stove, where they should always remain, being careful to shift them into larger pots when they require it, and not give them too much wet in the winter. In summer they should have a large share of air in warm weather, and be often refreshed with water.

These plants are very ornamental among other stove exotics.

HELIOTROPIUM, a genus comprising plants of shrubby, herbaceous, annual, and biennial kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Asperifoliae*.

The characters are: that the calyx is a one-leaved perianthium, tubular, five-toothed, permanent: the corolla monopetalous, salver-shaped: tube the length of the calyx: border flat, half-five-cleft, obtuse: clefts smaller, alternate, more acute, between the larger ones: throat naked: the stamina have five filaments, very short in the throat: anthers small, covered: the pistillum has four germs: style filiform, length of the stamens: stigma emarginate: there is no pericarpium: calyx erect, unchanged, cherishing the seeds in its bosom (berry): the seeds four, ovate, acuminate (nuts four, naked or corticate, not perforate.)

The species cultivated are: 1. *H. Peruvianum*, Peruvian Turnsole, or Heliotrope; 2. *H. Indicum*, Indian Turnsole, or Heliotrope; 3. *H. parviflorum*, Small-flowered Turnsole, or Heliotrope; 4. *H. Curassavicum*, Glaucous Turnsole, or Heliotrope; 5. *H. Canariense*, Canary Heliotrope.

The first rises with a shrubby stalk from two to three feet high, dividing into many small branches: the leaves are three inches long, and an inch and half broad in the middle, hairy, greatly veined, and ash-coloured on their under side, on short foot-stalks: the flowers are produced at the ends of the branches in short reflex spikes, growing in clusters: the peduncles divide into two or three, and these again into smaller ones, each sustaining a spikelet of pale blue flowers, which have a strong sweet odour. It grows naturally in Peru, flowering here great part of the year.

The second species has an herbaceous stem, a foot and a half or two feet high, round, scabrous, hirsute, subdivided: the leaves cordate-spatulate, ovate, slightly serrate, wrinkled, nerved, hairy, softish: on pretty long petioles, two inches and a half long, and one and a half broad in the middle: the spikes terminating, single or solitary; sometimes, but very seldom, double; sometimes also from the sides of the branches, reflex only at the end: the flowers sessile, pointing one way, approximating in a double row, small, blue. It is a native of the West Indies, and annual or biennial, flowering in July and August.

There is a variety which is a smaller plant, seldom more than two feet high; the leaves an inch and half long, and about half an inch broad: the spikes of flowers very slender, and not more than two inches long: the flowers small, and of a light blue colour.

The third has an erect stem, pubescent, a foot high: most of the leaves opposite, except those in the middle of the stem, which are alternate, petioled, lucid, and acute: the peduncles opposite to the leaves, or from the divisions of the stem, longer than the leaves, erect, each having two recurved, imbricate spikes of white flowers. It is annual, and a native of the West Indies, flowering in July and August.

The fourth species has an annual root: the stem round, very smooth, with a glaucous bloom on it: the branches trail on the ground, and grow a foot (or sixteen inches) in length: the leaves are somewhat blunt, quite entire, upright, on very short petioles, some alternate, others opposite, whitish, and smooth: the spikes in pairs on a common peduncle, and recurved: the corolla white, with a yellow base, and an open throat. It is a native of the West Indies, flowering in June and July in this climate.

The fifth rises with a woody stalk three or four feet high, dividing into many branches, with leaves upon long foot-stalks; hairy, and of an ash colour on their under side: the flowers are produced from the side of the branches on pretty long peduncles, each sustaining four short roundish spikes or heads, which divide by pairs,

and spread from each other: the flowers are white, and appear in June and July, but are not succeeded by seeds in this climate. The leaves, when bruised, emit an agreeable odour, for which it is by some much esteemed. The gardeners give it the title of Madam Maintenon. It grows naturally in the Canary Islands.

Culture.—The first is raised either by seeds or cuttings. In the first method the seeds may be sown upon a moderate hot-bed, or in pots to be plunged in a hot-bed in the early spring. When the plants have attained some growth, they should be removed into separate small pots filled with light earth, replunging them into the hot-bed, and giving them proper shade till well rooted.

They should afterwards be gradually inured to the open air, so as to be set out in warm situations in the summer. In the autumn and winter they should have the protection of a good green-house.

The cuttings should be planted in pots of light earth in the summer season, plunging them in a mild hot-bed. They soon take root, and afterwards require the same management as the seedlings. They seldom, however, make so good plants.

The three following sorts are increased by sowing the seeds on a hot-bed in the early spring, removing them as the heat declines to another hot-bed when necessary, managing them as Balsams and other tender annuals; and in the middle of the summer, removing them to the situations where they are to flower, with balls of earth about their roots.

The last sort is increased by planting cuttings of the young shoots in the summer in pots, or in a shady border, giving them water pretty freely. When well rooted, they may in the latter case be carefully taken up and put in pots, placing them in shady situations till fresh rooted.

They afterwards require the protection of the green-house from frosts and severe weather, being placed with plants of the more hardy sorts, such as Myrtles, and that require free air in mild weather.

The first and last sorts are very ornamental among potted green-house plants of the more hardy kinds; and the others among the more tender flowery plants in pots and borders.

HELLEBÖRE. See **HELLEBORUS**.

HELLEBORUS, a genus containing plants of the herbaceous perennial kind.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Multisiliquæ*.

The characters are: that there is no calyx, unless the corolla, which in some species is permanent, be considered as such: the corolla has five

petals, roundish, blunt, large: nectaries several, very short, placed in a ring, one-leaved, tubular, narrower at bottom: mouth two-lipped, upright, emarginate, the inner lip shortest: the stamina consist of numerous subulate filaments: anthers compressed, narrower at bottom, upright: the pistillum consists of about six germs, compressed: styles subulate: stigmas thickish: (five or more:) the pericarpium consists of capsules (leguminous, beaked) compressed, two-keeled: the lower keel shorter; the upper convex, gaping: the seeds several, round, and fixed to the suture.

The species cultivated are: 1. *H. hyemalis*, Winter Hellebore, or Yellow Winter Aconite; 2. *H. niger*, Black Hellebore, or Christmas Rose; 3. *H. viridis*, Green Hellebore; 4. *H. foetidus*, Stinking Hellebore, or Bear's-foot; 5. *H. lividus*, Livid Purple, or Great Three-flowered Black Hellebore.

The first has a tuberous transverse root, with many dependent fibres, putting up several naked stems or scapes, simple, smooth, round, from an inch or two to four inches in height, terminated by a single leaf, spreading out horizontally in a circle, divided into five parts almost to the base, and the parts simple, or divided into two, three, or four lobes. In the bosom of this sits one large, upright, yellow flower. It is native of Lombardy, and flowers with us from January to March.

The second has transverse roots, externally rough and knotted, with many dependent fibres, and some large roots striking down; the scapes from six inches to near a foot in length, round, upright, variegated with red, rising from a sheath, and terminated usually with one flower, sometimes two, and very rarely three: corolla very large, generally white at first, but frequently with a tint of red, growing deeper with age, but finally becoming green. It is a native of Italy, &c. flowering from December to March. Martyn observes, that "it has the name of *Black Hellebore* from the colour of the root; and of *Christmas Rose*, from the time of flowering and the colour of the corolla."

The third has a round stem, a little branched at top, but not near so much as in the next sort; leafy, reddish at the base, upright, smooth, a foot or eighteen inches in height: the leaves not of a stiff leathery consistence, as in the next species, but soft and of a lighter green; those from the bottom are on long petioles, but those on the stem sit close to their sheaths: the leaflets (seven to ten) lanceolate, acuminate, sharply serrate, smooth, gashed, usually trifid, the divisions sometimes deeply lobed; and at the base of each peduncle is a similar leaf, only smaller: the peduncles axillary, an inch long, round; supporting two (sometimes only one) nodding,

green flowers. It is a native of France, &c. flowering in March and April.

The fourth has a small but bent root, with a prodigious number of slender dark-coloured fibres: the stem is from eighteen inches to near a yard in height, towards the bottom round, strong, naked, marked with alternate scars, the vestiges of former leaves; dividing and subdividing at top into many branches, producing great abundance of flowers pendent, of a pale yellowish colour: the leaves composed of eight or nine long narrow lobes, joined at their base, commonly four on each side, united at the bottom, and one in the middle of the foot-stalk, serrate, and ending in acute points; those on the lower part much larger than those on the upper, of a deep green colour. It is a native of Italy, &c. flowering from November or December to April.

The fifth species resembles the third, but differs in having trifoliate leaves, broader and entire, their surface being smoother, and the stalks rise higher than either of the common sorts. It flowers from January to May.

Culture.—The first sort is increased by planting the off-sets from the roots after the leaves are decayed, in the latter end of the summer season, in the places where they are to flower, in patches of several roots together. They have the best effect when intermixed with the Snow-drop, as being of similar growth, and flowering about the same time. The off-sets may be separated from the old plants every three or four years.

The second sort is increased by parting the roots in the autumn, and planting them out in moist warm sheltered situations, in the borders or other parts where the soil is fresh and unmanured. And to have it flower well, it should be protected by glasses in the winter. Some plants may be potted in this intention.

The third and fourth sorts are raised by sowing the seeds in the autumn or early spring, either in the places where they are to grow, or in beds for the purpose, afterwards thinning them out to a few plants, or transplanting them into other beds, at the distance of a foot in the rows.

They rise well from self-sown seed, and succeed in shady situations very well.

The last sort is increased by seeds and parting the roots.

The well ripened seeds should be sown, or the roots planted out, in the autumn, either in pots of light fresh earth, or in warm protected situations in the borders. The plants should afterwards be protected in the green-house, or by hand-glasses in the winter. But they do not increase fast in either of these ways.

These are all ornamental plants; the first sort in the fronts of beds, borders, and clumps; and the third and fourth in the large borders and wilderness parts of pleasure-grounds. The se-

cond and last sorts produce a fine effect among collections of potted plants.

HELMET-FLOWER. See ACONITUM.

HELONIAS, a genus containing plants of the hardy herbaceous flowering perennial kind.

It belongs to the class and order *Hexandria Trigynia*, and ranks in the natural order of *Coronarie*.

The characters are: that there is no calyx: the corolla has six petals, oblong, equal, deciduous: the stamina have six subulate filaments, a little longer than the corolla: anthers incumbent: the pistillum is a roundish germ, three-cornered: styles three, short, reflex: stigmas blunt: the pericarpium is a roundish capsule, three-celled: the seeds roundish.

The species are: 1. *H. bullata*, Spear-leaved Helonias; 2. *H. asphodeloides*, Grass-leaved Helonias.

The first has a perennial root, composed of many thick fleshy fibres: the leaves spreading near the ground, and sitting close to the root at their base, of a light green colour, having six longitudinal nerves, which appear strongest on the under side; they are four or five inches long, two or three broad in the middle, narrowing gradually to both ends, and continuing green all the year. In the centre of these springs up a single erect stalk, a foot in height, having a few vestiges of small leaves, ending in sharp points, standing alternately close to the stalk: this is terminated by a close obtuse spike of dark-red flowers, with petals spreading open, flat: the filaments are twice the length of these; and the anthers are four-cornered, of a blue purple colour. It is a native of America, flowering the latter end of June (April and May).

The second species has the stem extremely simple, two feet high: the leaves alternate or scattered, upright, even, but rugged at the edge: the flowers are white, in a simple, terminating raceme, on peduncles longer than the flowers. It is a native of Pennsylvania, &c. flowering in May and June.

Culture.—These plants are increased by planting off-sets taken from the roots in autumn; or by sowing the seeds as soon as they are ripe, in a light fresh soil: they are hardy enough to thrive in the open air; but must not be removed oftener than once in three or four years. They require the same length of time in coming to flower when raised from seed.

These plants afford variety among others of similar growth in the principal flower compartments.

HEMEROCALLIS, a genus containing plants of the herbaceous flowery perennial kinds.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceae*.

The characters are: that there is no calyx: the corolla is six-parted, bell-funnel-form: tube short: border equal, spreading, more reflex at top: the stamina have six subulate filaments; the length of the corolla, declining; upper ones shorter: anthers oblong, incumbent, rising: the pistillum is a roundish germ, furrowed, superior: style filiform, the length and situation of the stamens: stigma obtusely-three-cornered, rising: the pericarpium is an ovate-three-lobed capsule, three-cornered, three-celled, three-valved: the seeds very many, and roundish.

The species are: 1. *H. flava*, Yellow Day-Lily; 2. *H. fulva*, Copper-coloured Day Lily.

The first has strong fibrous roots, to which hang knobs, or tubers, like those of the Asphodel, from which come out leaves, two feet long, with a rigid midrib, the two sides drawing inward, so as to form a sort of gutter on the upper side: the flower-stalks rise two feet and a half high, having two or three longitudinal furrows; these are naked, and at the top divide into three or four short peduncles, each sustaining one pretty large yellow flower shaped like a Lily, having but one petal, with a short tube, spreading open at the brim, where it is divided into six parts; these have an agreeable scent, from which some have given them the title of Yellow Tuberose. It is a native of Siberia, &c. flowering in June.

There is a variety with smaller roots; the leaves are not near so long, have not more than half the breadth, and are of a dark green colour: the flower-stalk is a foot and half high, naked and compressed, without furrows; at the top are two or three yellow flowers, which are nearer the bell-shape than the others, and stand on shorter peduncles.

The second species is a much larger plant than the first, and the roots spread and increase much more; the roots have very strong fleshy fibres, to which hang large oblong tubers: the leaves are near three feet long, hollowed like those of the former, turning back toward the top: the flower-stalks are as thick as a man's finger, and rise near four feet high; they are naked, without joints, and branching at the top, where are several large copper-coloured flowers, shaped like those of the Red Lily, and as large. These flowers never continue longer than one day, but there is a succession of flowers on the same plants for a fortnight or three weeks. It flowers in July and August.

Culture.—These plants are easily increased by planting the off-sets taken from the roots in autumn in any situation, as they are extremely hardy. They afterwards require no other culture, but to keep them clean from weeds, and to allow them room, that their roots may spread.

The first sort may also be increased by seeds, which should be sown in autumn. The plants

come up in the following spring, and these will flower in two years.

A moist soil and shady situation are the best suited to their growth; their size, and the great increase of their roots, especially in the second sort, render them most proper for large gardens and plantations, where they produce much variety and effect.

HEPATICA. See ANEMONE.

HERB, such a plant as rises with leaves and stalks annually from the root, the stalks not becoming woody or durable.

Many of the kitchen-garden esculents, and a great variety of ornamental or flowery plants, are of this kind. See HERBACEOUS PLANTS.

Many under-shrubby esculent and other plants are also sometimes considered as Herbs; such as sage, thyme, rue, hyssop, winter-savory, lavender, &c.: but these having ligneous, durable stalks and branches, more properly belong to the shrubby tribe.

HERBACEOUS PLANTS, such as have the properties of herbs.

All such as produce leaves and stalks annually from the root, and whose stalks or stems remain green and succulent, or soft, and do not become woody, or durable, but die down to the root every year, soon after they have produced flowers, &c. are properly of this sort, and of which there are annuals, biennials, and perennials.

They are thus very distinguishable from the woody kinds, such as trees, shrubs, and under-shrubs, whose stems and branches are woody or ligneous, and durable.

Of this class are most of the esculents of the kitchen-garden, except those of the under-shrubby kinds, such as sage, thyme, hyssop, &c. vast numbers of the flowery kinds for the pleasure-garden, almost all the annuals and biennials; as also all the perennials, both the fibrous, bulbous, and tuberous-rooted kinds, whose stalks decay annually.

HERMANNIA, a genus containing plants of the shrubby exotic kind.

It belongs to the class and order *Monadelphia Pentandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a one-leaved perianthium, five-cleft, roundish, inflated: the little clefts bent in, permanent: the corolla pentapetalous, spiral against the sun: claws the length of the calyx, with a little membrane on each side converging into a cowed nectareous tube: border spreading, broadish, blunt: the stamina have five filaments, broadish, very slightly coalescing at bottom into one body: anthers upright, acuminate, converging: the pistillum is a roundish germ, five-sided, five cornered: styles five, filiform, approximating, subulate, longer than the stamens: stigma simple: the

pericarpium is a roundish capsule, five-sided, five-celled, gaping at the top: the seeds very many, small, (kidney-form).

The species cultivated are: 1. *H. althæifolia*, Marsh-Mallow-leaved Hermannia; 2. *H. alnifolia*, Alder-leaved Hermannia; 3. *H. hyssopifolia*, Hyssop-leaved Hermannia; 4. *H. lavendulifolia*, Lavender-leaved Hermannia; 5. *H. grossularifolia*, Gooseberry-leaved Hermannia.

The first seldom rises more than two feet and a half high: the stem is not very woody, and the branches are soft and slender. The flowers are produced in loose panicles at the ends of the branches; are larger than those of the alder-leaved sort, and have hairy calyxes: they come out in June and July, and frequently again in the autumn. It is a native of the Cape.

The second species rises with a shrubby stalk six or eight feet high, dividing into many erect irregular branches, covered with a brown bark: the leaves narrow at their base, but broad and round at the top, about an inch long, and three quarters of an inch broad at the top: the flowers are produced in short spikes on the upper part of the branches; are of a pale yellow colour, and small; appearing in April and May.

The third rises with a shrubby upright stalk to the height of seven or eight feet, sending out many woody lateral branches, growing very erect: the leaves are about an inch and half long, and half an inch broad, serrate towards the end: the flowers come out in small bunches from the side of the stalk; are of a pale straw colour, appearing in May and June, and frequently followed by seeds, which ripen about the end of August.

The fourth species has shrubby branching stalks, which are very bushy, but seldom rise more than a foot and half high; the branches are very slender, and have hairy, pale-green leaves of different sizes; some of them two inches long, and an inch broad at their ends, but their common size is seldom more than one inch long, and half an inch broad; they are entire, and sit pretty close to the branches. The flowers come out from the side of the stalk singly, are small and yellow, continuing most part of the summer.

The fifth is a shrub of lower stature than the alder-leaved sort, but sends out a great number of branches, which spread wide on every side; the leaves are smaller than in that, rough and sessile: the flowers are produced in short close spikes at the end of every shoot, so that the whole shrub seems covered with them; they are of a bright yellow, and appear towards the end of April, but are not succeeded by seeds in this climate.

Culture.—These plants are all capable of being increased by planting cuttings of their young shoots in the early spring and summer months, in pots of good rich earth, plunging them in the first case in a moderate hot-bed, and giving them proper shade and water.

When they have stricken good root they should be removed with balls of earth about them into separate pots, filled with good light fresh earth, placing them in a shaded situation till perfectly re-established; when they should be exposed to the open air during the summer, but in the autumn and winter protected in the green-house, being deposited in an airy situation with myrtles and other similar plants.

They may likewise be raised from seed when it is good, here, or procured from abroad, by sowing it in pots of good mould, and plunging them in a hot-bed. The plants should be removed when of proper growth.

They afford ornament and variety among other potted evergreen plants.

HERNANDIA, a genus comprising plants of the evergreen exotic tree kind.

It belongs to the class and order *Monoecia Triandria*, and ranks in the natural order of *Tricoccæ*.

The characters are: that the male flowers are by pairs, lateral in each umbel: the calyx is a partial involucre, four-leaved, three-flowered: leaflets ovate, obtuse, spreading very much: there is no perianthium: the corolla has six petals, subovate, spreading; the three inner ones narrower: neetary, six glands, round-headed, placed round the filaments: the stamina consist of six filaments (three) shorter than the petals, inserted into the receptacle: anthers upright, oblong, large: female flower intermediate: the calyx is an involucre common with the males: perianthium inferior, one-leaved, bell-shaped, entire, permanent (inflated): the corolla has eight petals, of which four are interior and narrower, all sitting on the germ (petals six): the neetary has four glands, obovate, alternate with the interior petals: the pistillum is a roundish germ: style filiform: stigma oblique, somewhat funnel-shaped, large: the pericarpium is a dry drupe, ovate, eight-furrowed, one-celled, inclosed in a very large, inflated, roundish, fleshy, coloured perianthium, with the mouth entire: the seed is a globular nut, which is slightly depressed.

The species cultivated is *H. sonora*, Whistling Hernandia.

It is in its native situation an upright lofty tree, with an elegant head: the flowers are of a pale yellow colour, in paniced racemes; the calyxes of the fruit are yellow. It is common

in the West Indies, and there often termed Jack-in-a-box Tree.

The whistling noise which it produces is ascribed by Brown to the cups that sustain and partly envelop the nuts, which being large, as they move in the wind produce the sound.

Culture.—They are increased by sowing the seeds in a hot-bed in the spring. When the plants are two inches high, they should be transplanted each into a separate pot, filled with fresh rich earth, and plunged into the hot-bed again, observing to water and shade them until they have taken root; after which air should be admitted by raising the glasses, in proportion to the warmth of the atmosphere, and the heat of the bed, watering them frequently. As they advance they should be removed into larger pots, being careful not to break the roots, and to preserve a good ball of earth to them: when their leaves droop they should be screened from the sun until they have taken new root. They should be shifted in July, that they may be well rooted before the cold approaches. They must be kept constantly in the bark-stove; giving them in winter a moderate share of heat, and in summer plenty of air, when the weather is hot.

They produce a fine effect among other stove plants.

HESPERIS, a genus containing plants of the hardy herbaceous flowery kind.

It belongs to the class and order *Tetradynamia Siliquosa*, and ranks in the natural order of *Silicoseae*.

The characters are: that the calyx is a four-leaved perianthium: leaflets lanceolate-linear, from parallel converging, at top incumbent, at bottom gaping, deciduous: of these two opposite ones are gibbous at the base: the corolla is four-petalled, cruciform: petals oblong, the length of the calyx, a little bent back obliquely contrary to the sun's apparent motion, ending in attenuated claws, the length of the calyx: the stamina have six subulate filaments, the length of the tube; two of them shorter by half than the others: anthers linear, upright, reflex at the tip: an acuminate honeyed gland between each shorter stamen and the germ, and surrounding the stamen: the pistillum is a germ the length of the calyx, prismatic, four-cornered: style none: stigma two-parted, placed on the inside, oblong, upright, forked at the base, converging at the tip, withering: the pericarpium is a silique, long, pressed flat, stiff and straight, two celled, two-valved; the valves of the same length with the partition: the seeds very many, ovate, and compressed.

The species cultivated are: 1. *H. tristis*, Night-smelling Rocket, or Dame's Violet; 2. *H.*

matronalis, Garden Rocket, or Queen's Gilliflower; 3. *H. inodora*, Unsavoury Rocket.

The first has the leaves much larger than in those of the Garden Rocket, and of a paler green; the stalks are closely set with bristly hairs: the flowers grow in loose panicles at the top of the stalk, and appear about the same time with those of the second sort. It is a native of Austria, being much cultivated abroad for the great fragrantcy of the flowers in the evening. In Germany pots of it are placed in the apartments of the ladies; whence it has the name of Dame's Violet.

The second species rises with an upright stalk a foot and a half high, with spear-shaped leaves which sit close to the stalk, and are slightly indented on their edges, ending in acute points: the flowers are produced in a loose thyrse on the top of the stalks: the petals are roundish and indented at the points, of a deep purple colour, and smell very sweet, especially in the evening or in cloudy weather. It flowers in June, and the seeds ripen the latter end of August. It is a native of Italy.

It varies with single purple flowers, with double flowers of both colours, and with a mixture of both.

The *Siberian* variety differs in having a stalk of twice the height: the corolla is purple, not white, and in the claws of the petals being twice as long as the calyx, and the border blunt, and scarcely, if at all, emarginate.

The third rises with an upright stalk near two feet high: the leaves are dark, green, and sessile: the flowers grow in loose spikes on the top of the stalks; in some they are white, in others purple, and sometimes both colours striped in the same flower. They have no odour. It resembles the second species so much as scarcely to be distinguished from it.

It varies with double flowers in both colours.

Culture.—They are increased either by seeds, offsets from the roots, or by cuttings of the flower-stalk.

The seed should be sown in a bed or border of light earth, and either raked in lightly, or covered a quarter of an inch deep with light mould in the early spring. When the plants are come up three or four inches in height, they should be planted out in beds six inches apart, to remain till autumn or the following spring, when they should be removed where they are to flower.

As most of these seedlings produce single flowers, and many of these go off after they have flowered, it is proper to raise a fresh supply annually.

The double sorts are propagated with certainty

only by dividing the roots, or by planting cuttings.

In the first method, in order to promote offsets from the root, some good plants should be allotted in any open bed or border for propagation, not suffering them to run up fully to flower; but when their flower-stalks have advanced about eight or ten inches high, to cut them down close to the ground; and as they shoot again, to cut them also off; as, by thus stopping their upright growth, the roots will more readily throw out young offsets from their sides, which will be well formed by the beginning of autumn, when the whole root should be taken up, and the offsets divided separately, and planted in a nursery-bed six inches distant, to remain till the beginning of autumn, or spring following; then removed with balls of earth about their roots to where they are to stand and flower.

The flower-stalks which are thus occasionally cut down to promote the increase of offsets at bottom, may be divided into lengths, and planted as directed below; each cutting will form a plant for flowering the following year.

This practice should be pursued annually to keep up the stock of double flowers; for those which shoot up to full growth and bloom rarely put out any offsets, unless the stalks are cut down as soon as the flowers begin to fade, when sometimes they emit a few, but which are not so numerous or so strong as in the manner directed above.

The cuttings of the flower-stalks may be planted any time in the early part of summer, when the stalks are advanced about a foot in growth, or before they flower, each being cut and divided into two or three cuttings, four, five, or six inches in length. The lower half generally forms the best cuttings. They should be planted in a shady border, putting them two parts into the ground, about three inches asunder, giving water at the time, and repeating it frequently. Many of the cuttings will be well rooted, and form shoots at top in six or eight weeks. To promote their rooting more effectually, they should be covered close with hand or bell glasses, as soon as planted, raising the glasses when they begin to shoot at top, to admit air, to which they should be hardened gradually.

All the sorts are ornamental for the open borders of pleasure-grounds, and to intersperse, in assemblage with other herbaceous plants, towards the fronts of the more conspicuous shrubby clumps, on sides of lawns and walks, being always planted out in autumn, or early in spring, before they advance much for flowering.

HIBISCUS, a genus furnishing plants of the shrubby and flowery exotic kinds.

It belongs to the class and order *Monadelphia Polyandria*, and ranks in the natural order of *Columniferae*.

The characters are: that the calyx is a double perianthium: outer many-leaved, permanent: leaflets linear: more rarely one-leaved, many-cleft: inner one-leaved, cup-shaped, half-five-cleft, permanent: or five-toothed, deciduous: the corolla has five petals, roundish-oblong, narrower at the base, spreading, fastened at bottom to the tube of the stamens: the stamina have very many filaments, united at bottom into a tube, at top (in the apex and surface of this) divided and loose: anthers kidney-form: the pistillum is a roundish germ: style filiform, longer than the stamens, five-cleft at top: stigma headed: the pericarpium is a five-celled capsule, five-valved: partitions contrary, doubled: the seeds solitary or several, ovate-kidney-form.

The species cultivated are: 1. *H. Syriacus*, Syrian Shrubby Hibiscus, or *Althæa Frutex*; 2. *H. Trionum*, Bladder Hibiscus, Bladder Ketmia, or Flower of an Hour; 3. *H. Rosa Sinensis*, China Rose Hibiscus; 4. *H. mutabilis*, Changeable Rose Hibiscus, or Martinico Rose.

The first rises with a shrubby stalk to the height of six or seven feet, sending out many woody branches, covered with a smooth gray bark: the leaves have the upper part frequently divided into three lobes, placed alternately on the branches, and stand on short foot-stalks: the flowers come out from the wings of the stalk at every joint of the same year's shoot; they are large, and shaped like those of the mallow, having five large roundish petals, which join at their base, spreading open at the top in the shape of an open bell: these appear in August, and if the season is not too warm, there is a succession of flowers part of September. The early flowers are succeeded by short capsules; but unless the season proves warm, they do not ripen in this climate. It is usually termed *Althæa frutex* by the nursery gardeners. It is a native of Syria.

There are varieties with pale purple flowers, with dark bottoms; with bright purple flowers, with black bottoms; with white flowers, with purple bottoms; with variegated flowers, with dark bottoms, called *Painted Lady Althæa frutex*; with pale yellow flowers, with dark bottoms; with variegated leaves, and with double flowers.

The second species rises with a branching stalk a foot and a half high, having many short spines which are soft: usually the leaves are divided into three lobes, which are deeply jagged

almost to the midrib; these jags are opposite, and the segments are obtuse: the flowers come out at the joints of the stalks upon pretty long peduncles; the outer calyx is composed of ten long narrow leaves, which join at their base; the inner is of one thin leaf, swollen like a bladder, cut into five acute segments at the top, having several longitudinal purple ribs, and is hairy; both these are permanent, and inclose the capsule after the flower is past: the flower is composed of five obtuse petals, which spread open at the top, and form an open bell-shaped flower; these have dark purple bottoms, but are of a pale sulphur colour above, tinged sometimes partially with pale purple on the outside, where they are also ribbed: the capsule is ovate, the consistence of paper, pustuled with protuberances occasioned by the seeds, villous and black. It is annual, growing naturally in Italy, &c. The flowers are of short duration, in hot weather continuing only a few hours open; but there is a succession of them daily for a considerable time, in June, July, and August. It has been long known by the title of Venice Mallow.

There are varieties with erect purplish stems, and the flowers larger, and their colour deeper; and with large paler-coloured flowers.

The third, in its native situation, grows to the size of an ordinary tree; but here it is shrubby, the stem round, erect, with alternate, spreading branches, that are wand-like, leafy, brownish-green, and nearly smooth: the leaves alternate, spreading, unequally and coarsely serrate, entire at the base, five-nerved, bright green, very smooth, except the young ones, which are slightly downy; their petioles are round, downy on the upper side: the stipules in pairs, opposite, at the base of the petioles, linear, acute, deciduous: the flowers axillary, solitary, peduncled, large, of a deep scarlet colour, resembling a double rose. It is common in China and the East Indies. It is rare with single flowers.

The fourth species has a pale stem, single, smooth, spreading out wide into leafy branches at top; the wood resembling that of the fig: the leaves are the same size with those of the vine, having the roughness of fig leaves, and the form of both, or rather of the angular leaves of ivy; whitish underneath: the petioles rough, thick, three or four inches in length: the peduncles thicker towards the top, sometimes tinged with red, sustaining large handsome flowers, which alter in their colour, as at their first opening they are white, then they change to a blush rose-colour, and as they decay they turn to a purple. Martyn remarks, that in the West

Indies all their alterations happen the same day; but that in England, where the flowers last near a week in beauty, the changes are not so sudden. It is a native of the East Indies, &c. The period of its blowing in the stoves of this climate is November and December.

It varies with double flowers, from which the single is frequently produced; but the seeds of the single seldom vary to the double kind.

Culture.—The first sort is increased by seeds, layers, and cuttings.

The seeds should be procured from abroad, and sown in pots filled with light earth in the early spring months, plunging them in a gentle hot-bed to bring them forward, or on a border in a warm exposure. They should be watered during the summer, and be protected from frost in the winter. When they have had two years' growth, they may be set out in nursery rows, or be planted where they are to remain.

The layers should be laid down in the autumn, the shoots being cut on the backs at one or two joints, and well laid into the ground. They are generally well rooted in twelve months, when they may be taken off and removed to where they are to remain.

The cuttings of the young shoots should be planted in pots of light earth in the early spring, plunging them in a mild hot-bed; or they may be planted in a shady border in the summer season. When well rooted, they should be carefully taken up and planted where they are to remain, either in the autumn or spring.

The second sort is increased by sowing the seed either in the autumn or spring, in the places where the plants are to flower, in patches of several seeds together. When they come up, they should be thinned out to two or three plants in each patch.

The two last sorts may be increased by sowing the seeds in the early spring months, in pots filled with rich light mould, plunging them in a moderate hot-bed under glasses, or, what is better, in the bark-bed of the stove. When the plants are up, and have attained two or three inches in growth, they should be removed into separate small pots, watering them well, and replunging them in the hot-bed, where they must be kept.

They may likewise sometimes be raised by planting cuttings of the young shoots in pots of the same sort of earth, in the spring or summer, giving them water, and plunging them in the bark hot-bed. They should afterwards be managed as the others.

The two first hardy sorts are highly ornamental in the borders and clumps, among other flowery plants; and the two last tender sorts

produce much variety by their beautiful flowers in the stove and conservatory collections.

HIERACIUM, a genus containing plants of the hardy, herbaceous, flowery, perennial kind.

It belongs to the class and order *Syngenesia Polygamia Aequalis*, and ranks in the natural order of *Compositae Semiflosculosae*.

The characters are: that the calyx is common, imbricate, ovate: scales several, linear, very unequal, longitudinal and incumbent: the corolla compound, imbricate, uniform: corollules hermaphrodite, numerous, equal: proper monopetalous, ligulate, linear, truncate, five-toothed: the stamina have five capillary filaments, very short: anther cylindric, tubulous: the pistillum is a subovate germ: style filiform, the length of the stamens: stigmas two, bowed back: there is no pericarpium: calyx converging, ovate: the seeds solitary, obtusely four-cornered, short: down capillary, sessile: the receptacle naked.

The species cultivated are: *H. aurantiacum*, Orange-flowered Hawkweed; 2. *H. chondrilloides*, Gum-Succory Hawkweed.

There are several other species that have been cultivated, but which possess little merit.

The first has perennial, creeping roots: the stem scarcely branched (except with the peduncles), bearded with white hairs placed on black glands, upright, a foot or a foot and a half in height (two feet high): the leaves next the root rather ovate, on the stem ovate-lanceolate or lanceolate, quite entire, dusky green, narrowing into the petiole, obtuse, alternate, the upper ones sessile; the lower ones a span long, and an inch broad: the stipules very small, lanceolate: the flowers eight or ten, orange-coloured, on short pedicels, forming a short panicle. It is a native of Austria, &c. flowering from June to autumn. It was formerly distinguished by the titles *Golden Mouse-ear*; and when of a dark colour, *Grim the Collier*.

It varies in the colour of the flower, from red to orange, and several shades of yellow.

The second species has the stem a span high, and even: the root-leaves petioled, smooth: stem-leaves five or six, alternate, long, with long recurved teeth: the peduncles from the upper axils of the leaves, the same height with the stem, solitary, almost naked, one-flowered. It is a native of the South of France, flowering in June and July.

Culture.—These plants are increased by sowing the seeds in the early spring, on a bed or border of fresh earth, in an eastern exposure. When the plants are a few inches high, they should be removed into other beds, to stand till the autumn, when they should be planted where they are to remain. But it is a better prac-

tice to plant them at first where they are to grow.

They may likewise be increased by planting slips of the roots in the autumn or spring where they are to remain.

In both modes they should be well watered when the season is dry.

The roots continue many years when planted in a soil that is not too rich or moist.

They afford variety in the fronts of the borders, clumps, and other parts of pleasure-grounds.

HIPPOPHAE, a genus furnishing plants of the hardy deciduous shrubby kind.

It belongs to the class and order *Dioecia Tetrandria*, and ranks in the natural order of *Calyciflorae*.

The characters are: that in the male the calyx is a one-leaved perianthium, two-parted, two-valved, with the bottom entire; the parts roundish, blunt, concave, upright, converging at the tips, and gaping on the sides: there is no corolla: the stamina have four filaments, very short: anthers oblong, angular, almost the length of the calyx. Female—the calyx is a one-leaved perianthium, ovate-oblong, tubular, club-shaped, with the mouth cloven, deciduous: there is no corolla: the pistillum is a roundish, small germ: style simple, very short: stigma thickish, oblong, upright, twice as long as the calyx: the pericarpium is a superior berry, sub-globular, one-celled: the seed single, oblong, hard, shining.

The species are: 1. *H. rhamnoides*, Common Sea Buckthorn, or Sallow Thorn; 2. *H. Canadensis*, Canadian Sea Buckthorn.

The first rises with shrubby stalks eight or ten feet high, sending out many irregular branches, which have a brown bark silvered over: the leaves are narrow or linear-lanceolate, about two inches long, and a quarter of an inch broad in the middle, of a dark green on their upper side, but hoary on their under, with a prominent midrib; the borders are reflexed as in the rosemary; they are placed alternate on every side of the branches, and sit close to them; and there are little, clustered, peltate, ciliate, pale scales scattered over them: the branches spread wide, are straight, stiff, and thorny at the ends; the lesser ones numerous, scattered, short, and spreading: the flowers solitary, appearing before the leaves, generally abortive, unless the shrub grows in its natural situation: the male flowers below the leaves, between a branch and a one-valved, permanent bud, the length of the flower: the female flowers sessile in the axils of the lower leaves: the former are sub-sessile, somewhat spiked, disposed in four rows along the

lesser branches. The flowers come out from the branchlets of the former year; and the berries are abundant, on short peduncles, gratefully acid to the taste. It is a native of many parts of Europe, flowering from May to June. In sunny, sandy situations, it is planted for hedges; and it is used for dyeing yellow.

It varies with red berries.

The second species has the appearance of the first, but the leaves are broader, only half the length, of an ovate or oblong-ovate form; on the upper surface green, with diverging hairs, in bundles, scarcely to be discerned by the naked eye; on the lower, silvery with hairs and scales, and have rust-coloured dots scattered over them: the branches are opposite; and the racemes simple among the first leaves, upright, and shorter by half than the leaves. It is a native of Canada.

Culture.—These shrubs are easily propagated by planting suckers taken off from the roots in autumn, in the nursery. After they have had one year's growth, they are fit to plant out where they are to remain. They may also be increased by layers; but the roots spread and put up such abundance of suckers, that there is no necessity to be at this trouble.

They are also sometimes raised by planting cuttings of the young shoots as above.

As these shrubs have but little beauty, it will be sufficient to have one or two of them in plantations or borders.

HOE, an useful and well-known garden implement.

Hoes are of different kinds, as *Drawing* and *Scuffling* Hoes, and each sort has different sizes.

The first sort is fixed with its edge inward; the workman, in using it, draws it towards him. It is one of the most useful implements of gardening, for many purposes, both for general hoeing, and in drawing drills for sowing many sorts of seeds, loosening the earth about, and moulding up the stems of plants; and hoeing down weeds between all sorts of plants that stand distant enough to admit it. It is the best adapted of any for thinning out esculent crops to proper distances, to acquire their proper growth, such as onions, carrots, parsnips, turnips, spinach, &c.

Of this kind there should be three or four different sizes, from six inches width down to two inches.

The first size is a large Hoe for common use, about six inches long in the plate, by three or four broad, fixed on a long handle for both hands, and is the proper sort to use for all common hoeing work, and for drawing drills, for sowing peas, beans, kidney-beans, &c. with. It

is the most eligible sized Hoe of any for broad-hoeing between rows of all those kinds of plants, and all others that stand distant enough, either in rows or otherwise, for the Hoe to pass between them, both to cut down weeds and loosen the ground, and to earth up the stems of the plants, and for all other purposes of hoeing where the plants stand distant, both in the kitchen- and pleasure-garden.

The second size should be about four inches in the plate long-ways, and the same breadth as the above. It is useful for drawing drills, and for hoeing among various plants, where the former sort of Hoe cannot be commodiously employed; as well as to thin some sorts of esculent crops that require moderate distances; such as Dutch turnips, general crops of carrots, parsnips, &c. It is also a proper sized Hoe for hoeing common flower-beds and borders, &c. with.

The third size should be two inches and a half, or not more than three inches broad in the plate; and be fixed on a short handle to use with one hand in small-hoeing, thinning out several sorts of esculent crops, and other work among close-growing plants. A similar one should also be had fixed on a longer handle, to use two-handed in hoeing borders and other compartments of smaller plants, standing near together both in the kitchen-ground and flower-garden, &c. This sized hoe, on a short one-hand handle, is likewise particularly useful for small-hoeing, moulding, and thinning out many kitchen-garden crops in young growth; such as onions, leeks, carrots, parsnips, spinach, &c. to cut them out to the proper distances. It is also a very convenient size for use on many other occasions of hoeing; and for drawing small drills for sowing many kinds of seeds; and hoeing up flower-beds, &c. where the larger Hoes cannot be readily admitted between the plants, so as to stir the mould effectually.

The fourth size should be about two inches width, and fixed in a short handle. It is proper for small-hoeing onions and small crops of carrots, radishes, &c. the first time, where they stand pretty close, and where it is not designed to thin them out at once to their full distance, but to leave them rather thickish for culling, &c.

The edges of the Hoes should constantly be kept sharp by occasional grinding, that they may cut clean.

The second sort, or *Scuffling Hoe*, is commonly called a *Dutch Hoe*. It is fixed with the edge outward on the end of a long handle, so as that the person using it may push it from him, going backward, and never treading on the hoe.

ground, as with the drawing hoe. In regard to size, it should be from about four to six or eight inches wide, open in the middle, for the mould and weeds to pass through, so as not to be drawn in heaps; having a long socket at the back part, in which to fix the handle, which may be five or six feet in length.

It is very proper for scuffling over any piece of ground to destroy weeds, that is clear from crops, or between crops that stand wide, with which a person may make considerably more expeditious work than with a drawing hoe, especially when the weeds are not suffered to grow large; in which case one man can often do as much as two with the other sort. It is not proper for hoeing out crops of esculent plants, or for earthing up the stems of plants, nor for hoeing where the plants stand close. But it is very useful for cutting down weeds in shrubberies and wilderness quarters, where the shrubs stand distant from one another. And it is the best sort of any for scuffling over sand-walks, or others made of loose materials, in order to destroy weeds, moss, &c.

In a small size it is also found useful to run over flower borders, to cut up straggling weeds; as, being fixed on a long handle, the work may be effected by standing in the walks, without treading on the borders or beds.

A sort of triangular Hoe has also been lately found very useful in hoeing many sorts of small crops.

HOEING, a necessary operation performed by the hoe, to destroy weeds, loosen the soil, and mould up the stalks or stems of plants.

It is an expeditious method of destroying weeds between all sorts of plants that stand distant enough to admit it.

When principally designed to destroy weeds, it should always be performed to some depth, and in dry weather, the more sunny the better, especially when the weeds are not to be raked off, that they may die as they are cut down, or at least be so much flagged or withered by the sun and air as not to grow again.

This sort of work, besides destroying weeds, is likewise useful in loosening the surface, and disposing the ground to receive the greater benefit from the air, dews, rains, &c. to the great nourishment of all sorts of plants, and, by breaking up the surface, dividing the clods, and stirring the earth, keeping it fresh, and proving a very beneficial culture to all vegetables. In soils apt to bind after much wet, which causes the plants to appear of a stunted growth, hoeing is of vast advantage in promoting their growth.

The application of earth about the stems of plants, such as earthing up rows of peas, beans, kidney-beans, cabbages, cauliflowers, &c. is

constantly of great service in promoting the strength and vigour of the crops, as well as in giving them a neat appearance.

It is also beneficial in thinning out many close-standing crops to proper distances, cutting out the superabundant plants and weeds, and loosening the soil.

HOLLOW ROOT. See *ADOXA* and *FUMARIA*.

HOLLY. See *ILEX*.

HOLLY, KNEE. See *RUSCUS*.

HOLLY, SEA. See *ERYNGIUM*.

HOLLYHOCK. See *ALCEA*.

HOLM OAK. See *QUERCUS*.

HOLM, SEA. See *ERYNGIUM*.

HONEY-FLOWER. See *MELIANTHUS*.

HONEYSUCKLE. See *LONICERA*.

HONEYSUCKLE, FRENCH. See *HEDYSARUM*.

HONEY-WORT. See *CERINTHE*.

HOODED WILLOW-HERB. See *SCUTELLARIA*.

HOP-HORN-BEAM. See *CARPINUS*.

HOPS. See *HUMULUS*.

HORN-BEAM. See *CARPINUS*.

HORN-BEECH-TREE. See *CARPINUS*.

HORNED POPPY. See *CHELIDONIUM*.

HORSE-BEECH. See *CARPINUS*.

HORSE-CHESNUT. See *ÆSCULUS*.

HORSE-RADISH. See *COCHLEARIA*.

HORSE-TAIL. See *EQUISETUM*.

HORSE-TAIL, SHRUBBY. See *EPHEDRA*.

HORSE-DUNG, that which is produced in the stable.

It is a material of great utility in garden culture, for the purpose of forming hot-beds for various early productions and tender plants, and afterwards as manure. See *DUNG* and *MANURE*.

This sort of manure is mostly of a littery nature, from the great quantity of straw that is mixed and blended with the dung and urine of the horses. On this account it is more disposed to the production of heat, or the taking on the process of fermentation, than other sorts, and is of course better suited to the purpose of forming hot-beds with than any other.

For this use, it should be such as has remained together in the common dung-hill or heap till collected in proper quantity; and if it have commenced some fermentation, or become wholly, or in part, of a moist, warm, steamy quality, it is preferable. If, on turning it up with the dung-fork, it begins to assume a blackish appearance, not rotten, or exhausted and dry, but abounding in a fresh material substance, of a lively, moist, steamy warmth, it is in a good state for this purpose. Fresher dung

full of moist, warm, steamy litter, is also very desirable, as it may be readily brought to a proper condition.

In this sort, it is the best method to throw it up, to gather and mix the different parts well before it is made use of in preparing the beds.

But for the purpose of manure it is more proper for most sorts of crops when it is more reduced, and brought into a soft, moist state.

HOT-BED, a sort of bed constructed for the purpose of producing artificial heat.

These beds are mostly formed either of horse-dung or tanner's bark, being raised two, three, or four feet high, and covered with garden-frames and glasses, &c.

It is by the aid of these beds that various tender plants, flowers, and fruits, are raised in perfection, which, without such artificial heat, could not possibly be produced or continued in this climate. By this means, likewise, vast numbers of seeds, which would otherwise remain years in the earth, and some never grow at all, are made to germinate, form plants, continue their growth, and produce their flowers and fruits, as in their native soils. And the cuttings and slips of many sorts of trees and shrubs, which would otherwise remain inactive and perish, are also made soon to emit root, fibres, and shoots, and become plants.

By this means, likewise, many valuable esculent plants that succeed in the full ground at one time of the year or other, are brought to perfection much sooner than they could otherwise be obtained, as the cucumber, asparagus, peas, beans, kidney-beans, radishes, carrots, strawberries, and various salad herbs, and other plants, which grow in the open ground.

Annual flowering plants, as well as those of the herbaceous and shrubby kinds, are also brought to more early perfection and flowering by them. They are therefore of great use in the practice of gardening.

Dung Hot-beds.—The proper situations for making these beds in are the forcing-ground, or other sheltered, warm, sunny exposures.

Hot-beds are sometimes made entirely on level ground, and sometimes in a trench or oblong cavity formed in the ground, the width and length of the intended bed, and from twelve inches to a foot and-half deep or more; but for early work in winter or spring, they should be mostly above ground, upon the level rather elevated surface, that the bottom of the bed may stand dry, and not be liable to be chilled by wet, as, when made in this way in those seasons, when the heat declines, both sides of the bed may be lined with hot dung quite to the bot-

tom, so as the whole bed may have an equal benefit of the lining to revive its declining heat, which is essentially necessary during winter and spring, until the middle or latter end of May. But when Hot-beds are made in trenches at an early season, when linings must be added to support a constant regular heat, all that part of the beds within the ground is deprived of the advantage of them.

The forms and dimensions of dung Hot-beds should generally be that of long squares, ranging nearly east and west, to any length convenient; about four feet and a half broad, if to be covered with common garden-frames; and three and a half or four feet, if for hand-glasses; raising them, if in winter, or early in spring, three or four feet or more high, allowing for settling, as they will settle half a foot or more in a week or two's time after making. The early beds should be substantial, otherwise they will not support a durable uniform temperature of heat for continuing the plants in a regular, free growth; which, by aid of linings, must be effected till the arrival of warm weather. Those made in winter should be three feet and a half high, at least, when first made; or if four, the better; in March a yard high, in April the same, or two feet and a half, and in May two feet.

They may be made for a one-light, two-light, or three-light frames, and for two, three, or more three-light frames in a range, according to circumstances.

Forming the Beds.—After marking them out, some of the longest or most strawy dung should be shaken along the bottom, to begin the bed with; then the long and short together, as it comes to hand, shaking it evenly on every part, raising the sides perfectly upright, straight, and as firm as possible; forming the corners also full and very firm, keeping the middle well filled with the best dung; and, as the work advances, beating each layer of dung evenly and firmly down, with the dung-fork; or, when it is very long, loose, strawy dung, treading it in to settle every part equally; proceeding in this manner till the bed is arrived to its designed height, raising that intended for frames, two or three inches higher in the back or north side than in front, to give the greater slope to the glasses to the sun, finishing the top even in every part; and when the bed is thus raised, trimming up all the short dung remaining at last round the bed, laying it on the top ridgeways along the middle, which may either then, or rather, if a strong bed, in a few days after, when the bed has settled a little, be levelled, to make good all inequalities, and smooth the surface. After this, set the frame, &c. on, and earth the bed as

directed below. See FRAMES and HAND-GLASSES.

The Hot-bed being thus formed, when of considerable substance, it may be advisable to defer the framing and earthing it finally for several days, or a week or more, according to the strength of the bed, until a little settled, and the first violent heat has subsided; as the heat will be very strong, and frequently of a burning nature for the first week or two after it is made. It may, however, often be proper to set the frames and glasses on, to defend the bed from excessive rains or snow, as well as to draw up the heat sooner, to forward the bed to a proper temperature for the reception of the mould, and seeds or plants. The upper ends of the lights should be raised a hand's breadth high, or shoven so much down in dry weather, that the great steam arising may pass freely off; as in strong Hot-beds neither the earth, seed, or plants, should be put in till the fierce heat and violent steam have a little abated. Hot-beds of slender substance may, however, be framed, earthed, &c. as soon as made, as no great danger is to be apprehended from burning, and more particularly those for small frames, hand-glasses, &c.

Where there is an extensive range of substantial Hot-beds, the placing the frames on them before they are fixed for good, is often inconvenient; in which case it is proper to have mats, or dry long litter, ready to cover the tops in case of excessive rains or snow, which might chill and retard the beds greatly from becoming of a due temperature for the reception of the earth, &c. and sometimes occasion them to become of a burning quality, when they otherwise would be of a regular heat.

In Hot-beds designed for strength and duration it will, as soon as they are made, be proper to provide some sharp-pointed sticks, two feet long, to thrust down into the middle of the beds in different parts, that by pulling them out daily, and feeling their lower parts, a judgment may be formed of the working and temperature of the beds, and when in a proper state for the reception of the mould and plants.

When the Hot-bed is therefore of good substance, and for the large frames, it is proper to let it remain some days to settle, before it is framed for good, because, notwithstanding all the care in making, it will often settle unequally, and should be levelled before it is earthed; in from about three to five, six, or eight days, according to the nature of the dung, or substance of the bed, it will have so far settled as to discover the inequalities, if any; when, if the frames and glasses were placed thereon for the purposes

above mentioned, when the whole has settled, all the inequalities should be made even by levelling the top, making the surface firm, and smoothing it off neatly with the back of the spade. Then the frame and glasses should be put on for good, opening the lights a little at top to give vent to the steam.

Earthing the Beds.—As substantial dung Hot-beds, after being covered with the frames, &c. sometimes heat violently the first week or fortnight, when the earth is put in during the fierce heat, by confining the heat and steam still more closely, it is in danger of being burnt, and also of destroying the seed and roots of the plants, if any were sown or planted. When the earth is thus burnt by the heat of the dung, no seeds or plants can vegetate or thrive in it; it must therefore be taken out, and be replaced by fresh compost. Hot-beds of considerable substance should of course be examined previous to moulding them, to ascertain the state of heat daily, both by the sticks, and thrusting the hand down into the dung. And when it is found of a due temperature, the mould should be put on. This is sometimes shown to be the case by the appearance of a sort of mushroom spawn.

But in slender Hot-beds, as their heat is never so violent or durable, they may either be earthed as soon as made, or in two, three, or four days afterwards, as judged proper. In all cases care should however be taken that the beds do not lose any time, for them to waste their heat ineffectually, without being earthed.

For all sorts of Hot-beds the earth or mould should be rich, light, and of a dry quality, particularly for early work in winter and spring, and tender plants, such as cucumbers, melons, tender annuals, &c. as very moist earth rots such plants while young, binds too close, and by its compactness confines the heat and steam, so as often to burn at bottom, and scorch the roots of the plants. Some light mould should therefore be always in readiness in some airy shed, for two or three weeks before it is wanted. See COMPOST.

The depth of earth or mould necessary to be applied over Hot-beds, must be different according to the purposes for which they are designed, as for sowing seed on, or the reception of plants, and the nature of the plants, or chiefly for plunging pots in. In general, however, from about five or six, to ten or twelve inches, is the common depth. For sowing seeds to raise plants for transplantation, the depth of mould should be about six inches; and where they are to remain to acquire their full growth, not less than from six or eight to

ten or twelve inches in depth. If for the immediate reception of plants, to remain, or for striking cuttings of any sort in, &c. from six to eight, ten, or more inches of mould will be necessary; regulating the whole in some proportion to the nature or growth of the plants, and the substance of the beds. Thus, cucumbers and melons, which are not only extensive growers, but produce large fruit that requires much nourishment, need a greater depth of mould than small salad-herbs, &c.

In earthing the beds, every part of the dung within the frame should be carefully covered over, especially after the plants are come up, or any planted, that no steam may rise immediately from the dung upon them.

In regard to sowing or planting seeds or plants in Hot-beds of strong substance, under frames, care should be taken not to do it till the danger of burning is over, unless performed in pots, that may be moved up as occasion requires; and at any rate it is always better to wait a day or two, than to endanger burning the plants; time should not however be lost when the bed is ready, as it is necessary always to have a lively heat at first, to promote a quick germination in the seeds, or to strike and set the plants forward so as to assume a free growth at first.

In the management of Hot-beds after being sown or planted, it must often be different, according as the different plants may require. In general, however, after the seeds or plants have been put in, the glasses are to be continued constantly on until the middle of summer, when the weather is become settled and warm, particularly for all the tender kinds of plants; fresh air being admitted daily, at all opportunities, in mild weather, by raising the upper ends of the lights; or, if hand-glasses, by propping up one side, from about half an inch to two or three inches high, according to the heat and steam in the bed, and temperature of the outward air, shutting all close in due time towards evening, and keeping them close every night during the cold weather, covering the glasses every night with mats until June, especially for the more tender sorts of plants.

When the heat of the beds naturally declines or becomes of a weakly temperature, it must be renewed by adding fresh hot dung around the sides, which is called lining the bed, and is particularly necessary for all dung hot-beds, made any time in winter or spring. See LINING.

Sometimes a repetition of new linings is required three or four times, especially for those made in winter, to continue them in a uniform heat; these linings should be made of the hottest dung, and be applied quite from the bottom to

the top of the bed, and about fifteen or eighteen inches wide at bottom, drawing them into about a foot wide at top, raising them four or five inches up the frame, to allow for settling, but not more; for the top of the linings, when settled, should be but very little above the bottom of the frame, lest their heat burn the earth adjoining to the frame within: and to prevent steam from rising too copiously from the linings, a stratum of earth should be laid on the top, two inches thick, continuing it close up to the bottom of the frame, that no steam may rise that way; for the rank steam immediately from dung, without first passing through a body of earth, is destructive to most plants. As the lining settles down lower than the top of the bed, more fresh dung should be added.

Bark Hot-beds.—These are Hot-beds formed of bark or tan, after having been used in tan-vats or -pits, which produces a regular, moderate, and durable heat. See BARK.

Hot-beds of this kind always require to be made in proper bark-pits formed for the purpose of brick-work, or post and planking, to confine the tan in its proper situation. See BARK-PIT.

Where there are proper conveniences of pits, in which to make the hot-beds furnished with frames and glasses suitable, they are superior in many cases to dung Hot-beds, both in raising many early esculent productions, and various curious flowers to early bloom, as well as in the propagation and raising many sorts of tender exotics, from seeds, layers, cuttings, &c. In bark Hot-beds early strawberries and melons may be raised, which, by the regular, moderate, and durable heat which they produce, are generally obtained in great perfection at an early season; likewise, small early crops of dwarf-peas and kidney-beans, &c. and of flowering plants, many sorts may be forced in great perfection of early bloom, both of the bulbous, tuberous, and fibrous-rooted kinds, such as hyacinths, dwarf tulip, jonquils, narcissuses, anemones, ranunculuses, pinks, and many other moderate-growing kinds; also roses, and some other small ornamental flowering shrubs.

Bark Hot-beds are also of great utility in hot-houses, stoves, and forcing-houses, as the principal and most proper and effectual kind of beds for these different departments. See BARK-BEDS.

Forced Crops.—The sorts of crops usually raised in these hot-beds are cucumbers, melons, asparagus, strawberries, kidney-beans, peas, dwarf-beans, radishes, small-salad herbs, and lettuces. And various sorts of seed plants are raised and preserved in this way, such as cauliflowers, early cabbages, red cabbages, early celery, plants

For pricking out, carrots, small white turnip-radishes, Dutch turnips, mint, tarragon, tansey, basil, capsicums, love-apples, coriander, purslane, early dwarf potatoes, and mushrooms, in a bed of a peculiar sort. But those for which these beds are absolutely necessary are all the first sort, and basil, capsicum, love-apple, and mushrooms.

HOT-HOUSE, a sort of garden-erection, mostly formed of glass-work, in which a constant, regular degree of artificial heat by fire and bark-hot-beds is kept up.

It is made use of for procuring some sorts of fine fruits, such as the pine-apple, and for raising and preserving various sorts of tender exotics from the hot parts of the world.

In the construction of these houses, a wall of eight or ten feet high or more, is raised behind, with a low wall in front and both ends, on which is placed upright glass-work, four, five, or six feet, and a sloping glass roof, extending from the top of the front to the back wall. Internal flues for fire-heat, in winter, are also contrived, and a capacious oblong or square pit in the bottom space, in which to have a constant bark-bed to furnish a continual regular heat at all seasons; so as in the whole to warm the inclosed internal air always to a certain proper high degree.

Besides the above, these Houses are of great utility in forwarding many sorts of choice or desirable hardy plants, flowers, and fruits, to early perfection, which being sown or planted in pots, and placed in them in winter, or early in spring, the constant heat thus produced forwards them to maturity two or three months or more before their natural season in the full ground; such as kidney-beans, strawberries, &c.: also many sorts of flowering plants, both annuals and perennials, of moderate growth, are forwarded to early bloom; and vines planted in the outside, close to the front, the stem of each introduced through a small hole above, and the internal branches trained up under the glasses, produce grapes at an early period, as in May. In Hot-houses, likewise, early cucumbers may be raised in good perfection; and the seeds, cuttings, slips, &c. of many curious tender plants forwarded exceedingly in their growth, by plunging the pots containing them in the bark-bed. See **STOVE**.

These Houses are mostly ranged lengthways nearly east and west, that the glasses of the front and roof may have the full influence of the sun. This is the most convenient situation for common Hot-houses, either for pines or other exotics.

Some Houses of this sort, instead of being placed in this direction, have lately been rang-

ed directly south and north, having a sloped roof to each side like the roof of a house; also to the front or south end; both sides and the south end front being of glass. These Houses are made from ten or twelve to fifteen or twenty feet wide, the length at pleasure; and from ten to twelve feet high in the middle, both sides fully head height; being formed by a brick wall all round, raised only two or three feet on both sides, and south end; but at the north end like the gable of a house. Upon the top of the side and south end walling is erected the framing for the glass-work, which is sometimes formed two or three feet upright, immediately on the top of the wall, having the sloped glass-work above; and sometimes wholly of a continued slope on both sides, immediately from the top of the side walls to that of the middle ridge. They are furnished either with one or two bark-pits; but if of any considerable width, generally with two ranging parallel, one under each slope of the top glass, separated by a two-feet path running along the middle of the House, and sometimes continued all round each pit, with flues ranged along against the inside walls; the whole terminating in an upright funnel or chimney at the north end.

Other Hot-houses are formed entirely square, having a ten- or twelve-foot brick wall behind; that of the front and both sides, only two or three feet high for the support of the glass-work, placed upright nearly the same height, and sloped above on both sides and front, which are wholly of glass. These are furnished within with bark-pits and flues, as in the others.

In particular cases they are likewise made semicircular, or entirely circular, being formed with a two or three feet brick wall supporting the glass framing, which is continued quite round; having the bark-pit also circular, and flues carried all round the inside of the walling, terminating in a chimney on the northern side.

The first forms are probably the best for general purposes.

Hot-houses on these plans are made of different dimensions, according to the sizes of the plants they are designed to contain; but for common purposes they should be only of a moderate height, not exceeding ten or twelve to fourteen feet behind, and five or six in front: some are, however, built much more lofty behind, to admit of the taller growing exotics placed towards the back part, to grow up accordingly in a lofty stature; but the above are best adapted to the culture of pines, and other moderate growing plants, as well as for forcing in; as very lofty houses require a greater force of heat, and by

the glasses being so high, the plants receive less benefit from the sun, and are apt to draw up too fast into long slender leaves and stems, as they naturally tend towards the glasses. Where the top glasses are of a moderate distance from the plants, they receive the benefit of the sun's heat more fully, which is essential in winter, and become more stocky at bottom, and assume a more robust firm growth, particularly the pineapple, and are thereby more capable of producing large fruit.

After having determined on the dimensions as to length and width, the foundations of the walls should be set out accordingly of brick-work, allowing due width at bottom to support the flues a foot wide, wholly on the brick bases; detached an inch or two from the main walls; then setting off the back or north wall a brick and a half or two bricks thick, and the front and end walls nine inches, carrying up the back wall from ten to fourteen feet high; but those of the front and ends only from about two feet to a yard; taking care, in carrying up the walls, to allot a proper space for a door-way, at one or both ends, towards the back part; setting out also the furnace or fire-place of the flues in the bottom foundation, towards one end of the back wall behind, formed also of brick-work, made to communicate with the lowermost flue within. But when of great length, as forty feet or more, a fire-place at each end may be necessary; or, if more convenient, may have them in the back part of the end walls, or both in the middle way of the back wall; each communicating with a separate range of flues; in either case, forming them wholly on the outside of the walls, about twelve or fourteen inches wide in the clear, but more in lengthways inward; the inner end terminating in a funnel to communicate internally with the flues, fixing an iron-barred grate at bottom to support the fuel; calculated for coal, wood, peat, turf, &c. An ash-hole should be made underneath. The mouth or fuel door should be about ten or twelve inches square, having an iron frame and door fixed to shut with an iron latch as close as possible. The whole furnace should be raised sixteen or eighteen inches in the clear, finishing the top archways. Then continue carrying up the walls of the building regularly, and on the inside erect the flues close along the walls.

It is sometimes advantageous to have the flues a little detached from the walls, one, two, or three inches, that, by being thus distinct, the heat may arise from both sides, which will be an advantage in more effectually diffusing the whole heat internally in the house; as, when they are attached close to the walls, a very considerable

portion of the heat is ineffectually lost in the part of the wall behind. In contriving the flues, they should be continued along the front and both ends, in one range at least, in this order. But it is better if they be raised as high as the outward front and end walls, in one or two ranges, one over the other. On the tops of these may be placed pots of many small plants, both of the exotic and forcing kinds.

Thus proceed in the construction of the flues, making them generally about a foot wide in the whole, including six or eight inches in the clear, formed with brick-work, on edge; the first lower flue should communicate with the furnace or fire-place without, and be raised a little above it, to promote the draught of heat more freely, continuing it along above the intended level of the floor of the back alley or walk of the house the above width, and three bricks, on edge, deep, returning it in two or three ranges over one another, next the back wall, and in one or two along the ends, and front wall, as the height may admit; each return two bricks, on edge, deep, and tiled or bricked over. In the beginning of the first bottom flue a sliding iron regulator may be fixed, to use occasionally, in admitting more or less heat, being careful that the brick work of each flue is closely jointed with the best sort of mortar for that purpose, and well pointed within, that no smoke may break out; having each return closely covered with broad square paving tiles on the brick-work; covering the uppermost flues also with broad, thick, flat tiles, the whole width, all very closely laid, and jointed in mortar. The uppermost or last range of flues should terminate in an upright vent or chimney at one end of the back wall; and where there are two separate sets of flues, there should be a chimney at each end. An iron slider in the termination of the last flue, next the chimney, may also be provided, to confine the heat more or less on particular occasions.

Sometimes, in very wide houses, in erecting the flues, to make all possible advantage of the fire-heat, one or more spare flues, to use occasionally, is continued round the bark-pit, carried up against the surrounding wall, but detached an inch or two, to form a vacancy, for the heat to come up more beneficially, and that by having vent, it may not dry the tan of the bark-bed too much; and in the beginning a sliding iron regulator may be fixed, either to admit or exclude the heat, as expedient; so that the smoke, by running through a larger extent, may expend its heat wholly in the flues before it is discharged in the chimney.

Great care must likewise be taken that neither

the fire-place or flues be carried too near any of the wood-work.

After this, proceed to set out the cavity for the bark-pit, first allowing a space next the flues for an alley or walk, eighteen inches or two feet wide all round, and then in the middle space form the pit for the bark-bed, six or seven feet wide, the length in proportion to that of the House, and a yard or more deep; inclosing it by a surrounding wall. It may either be sunk at bottom a little in the ground, raising the rest above, by means of the parapet wall; or, if there is danger of wet below, it should be raised mostly above the general surface. The surrounding wall should be nine inches, but a brick-wide wall is often made to do, especially that part which forms the parapet above ground. It should be coped all round with a timber plate or kirk, framed and mortised together, which effectually secures the brick-work.

The bottom of the pit should be levelled and well rammed, and if paved with any coarse material, it is an advantage in preserving the bark. And the path or alley round the pit must be neatly paved with brick or stone.

The glass-work for inclosing the whole should consist of a close-continued range of glass sashes all along the front, both ends, and roof, quite up to the back wall; each sash being a yard, or three feet six inches wide; and for the support of which, framings of timber must be erected on the brick-wallings, conformable to the width and length of the sashes.

For the reception of the perpendicular glasses in the front and ends, a substantial timber plate must be placed along the top of the front and end walls, upon which should be erected uprights, at proper distances, framed to a plate or crown-piece above, of sufficient height to raise the whole front head high, both ends corresponding with the front and back; a plate of timber being also framed to the back wall above, to receive the sloping bars from the frame-work in front; proper grooves being formed in the front plates below and above, to receive the ends of the perpendicular sashes, sliding close against the outside of the uprights all the way along the front, or they may be contrived for only every other sash, to slide one on the side of the other.

And from the top of the upright framing in front should be carried substantial cross-bars or bearers, sloping to the top of the back wall, where they are framed at both ends to the wood-work or plates, at regular distances, to receive and support the sloping glass sashes of the roof, when placed close together upon the cross bars or rafters, and generally ranging in two or more

tiers, sliding one over the other, of sufficient length together to reach quite from the top of the upright framing in front, to the top of the back-wall. The cross bars should be grooved lengthways, above, to carry off wet falling between the frames of the sloping lights; making the upper end of the top tier of glasses shut close up to the plate in the wall behind, running under a proper coping of wood or lead, fixed along above close to the wall, and lapped down of due width to cover, and shoot off the wet sufficiently from the upper termination of the top sashes. Some wide Houses have, exclusive of the main slope sliding glass sashes, a shorter upper tier of glass fixed; the upper ends being secured under a coping as above, and the lower ends lapping over the top ends of the upper sliding tier, and this over that below in the same manner, to shoot the wet clear over each upper end or termination; likewise along the under outer edge of the top plate, or crown-piece in front, may be a small channel to receive the water from the sloping glass sashes, and convey it to one or both ends without running down upon the upright sashes, being careful that the top part behind be well framed and secured, water-tight, and the top of the back wall finished a little higher than the glasses, with a neat coping the whole length.

The bars of wood which support the glasses should be neatly formed, and made neither very broad or thick to intercept the rays of the sun. Those, however, at top, should be strong enough to support the glasses without bending under them. In wide Houses uprights are arranged within at proper distances, to support the cross rafters more perfectly.

In respect to the glass work in the sloping sashes, the panes of glass should be laid in putty, with the ends lapping over each other about half an inch; the vacancies of which are in some closed up at bottom with putty, others leave each lapping of the panes open, in order for the air to enter moderately, and that the rancid vapours arising from the fermentation of the bark-bed, &c. within, may thereby be kept in constant motion without condensing much; and also that such as condense against the glasses, may discharge itself at those places without dropping upon the plants. The upright sashes in front may either be glazed as above, or the panes laid in lead work; being very careful to have the glazing well performed, and proof against wet.

The doors should have the upper parts sashed and glazed to correspond with the other glass-work.

On the inside the walls should be plastered,

pargeted, and white-washed; and all the wood-work within and without, painted white in oil colour.

Ranges of narrow shelves for pots of small plants may be erected where most convenient, some behind, over the flues, a single range near the top glasses towards the back part, supported either by brackets suspended from the cross bars above, or by uprights erected on the parapet wall of the bark-pit. A range or two of narrow ones may also be placed occasionally along both ends above the flues.

In wide Houses, where the cross-bars or bearers of the sloping or top glass sashes appear to want support, some neat uprights, either of wood or iron, may be erected upon the bark-bed walling, at convenient distances, and high enough to reach the bearers above.

On the outside behind should be erected a close shed the whole length, or at least a small covered shed over each fire-place, with a door to shut, for the convenience of attending the fires; but the former is much the best, as it will serve to defend the back of the Houses from the outward air, and to stow fuel for the general use of them, also for garden-tools, and all garden utensils when not in use, to preserve them from the weather; as well as to lay portions of earth in occasionally, to have it dry, for particular purposes in winter and early spring.

Sometimes Hot-houses are furnished with top covers, to draw over the glass sashes occasionally, in time of severe frosts and storms; and sometimes by slight sliding shutters, fitted to the width of the separate sashes; but these are inconvenient, and require considerable time and trouble in their application. At other times they are formed by painted canvass, on long poles or rollers, fixed lengthways along the tops of the Houses, just above the upper ends of the top sashes, which, by means of lines and pulleys, are readily let down and rolled up.

In the annexed plate is contained the front elevation and ground plan of an improved House of this sort, which has been found to answer well in practice.

Fig. 1. Front elevation.

Fig. 2. Ground plan.

Fig. 3. Section.

A plan for another kind of improved Hot-house has been suggested by Dr. James Anderson, for which he has taken out a patent. It produces its effects chiefly by the heat of the sun, without the aid of flues, tan-bark, or steam. This improvement extends to every sort of Hot-house; and the advantages of such Hot-houses are, according to the statement of the doctor,

1st. That "in every kind of temperature, if the works are to be erected new from the foundation, few cases can occur in which they may not be so placed as that the *whole* heat required may be obtained without occasioning the expenditure of *one shilling* for fuel; but in the most unfavourable cases that can occur, the expenditure of fuel will *not* amount to *one tenth* part of what is now universally employed for producing similar effects."

2d. That "in a Vinery, for example, where the grapes are not meant to be forced farther than to ripen from the middle of June to the end of July, as the season may be, no fuel will in any case be required, the whole effect being produced by the heat of the sun alone."

3d. That "where the grapes are to ripen in April or May, some artificial heat will be wanted; but the quantity of fuel, even in this case, will be so inconsiderable, that in a house which produces, on an average of years, under ordinary good management, not less than *ten thousand* full-sized bunches of grapes, and fifteen hundred pots of strawberries, or other such plants, the consumption of fuel will not exceed *half a London chaldron of coals*; and so in proportion for those of larger extent."

4th. That "in the Pinery and Stove the expenditure of fuel will be diminished in a proportionate degree; while, at the same time, the use of *bark* (or of *steam*, as a substitute for the heat of tan) will be entirely dispensed with; which, in many situations, will be the saving of much expense."

5th. That "these savings of expenditure will be effected not only without any detriment to the pines and other plants, but with great advantage to them all; for, in consequence of these improvements, those diseases which so much weaken and often destroy the most valuable plants, the damp in particular, will be entirely removed, and vermin in a great measure annihilated; the plants too, in consequence of the ventilation that may be at all times given them at pleasure to any degree that shall be thought proper (without varying the temperature from that degree which may be deemed most salutary to the plants, at the same time that it may be changed at will from moist to dry, or the reverse), may be kept in a state of perpetual health and luxuriance that has been hitherto unknown in these repositories." And,

6th. That "all these effects will be produced by such a simple apparatus, and that so adapted as to moderate of itself extremes of every sort, that it will become a matter of much less nicety and trouble to the gardener than at present; as he may safely be absent for a much longer time,

and thus the accidents which originate from negligence less frequently occur."

These houses are made almost wholly of wood and glass. The base is a frame of wood, which rests horizontally upon posts fixed firm in the ground, to which the frame is screwed by strong iron screws; the whole being so constructed as to admit of being taken down and removed at pleasure without violence, merely by undoing the screws. They are capable of being formed of any dimensions. A full explanation of their nature, and the principles on which they produce their effects, may be seen in the doctor's work on the "Patent Hot-house."

Hot-houses on this plan are constructed by George Byfield, esq. architect, Craven-street, Strand, London; and Mr. Samuel Butler, Hot-house-builder, Little Chelsea.

Nursery and Succession Houses.—In addition to these Hot-houses, others of smaller dimensions, for striking and raising the young plants in, and as Succession Houses for receiving them into afterwards, when of a year's growth, to bring them forward to a proper size for being used as fruiting plants, are necessary, especially where the pine-apple is cultivated upon an extensive scale, in order to afford full room in the large Houses for the fruiting plants.

These Houses may be erected either as appendages to the main house, or detached at a little distance, as most convenient. When the situation admits, it is however more convenient and ornamental to join them in a line with the main House, one at each end. They are formed nearly of the same construction, only smaller both in length, width, and height.

Nursery-House.—This is sometimes formed in the manner of a common detached bark-pit, without any upright glasses in front, having a wall all round, five or six feet behind, gradually sloping at each end, to about four feet in front, and with only sliding glasses at top. Its dimensions must vary according to the extent of plants. It is often termed simply the pit, as the whole internal space in length and width is allotted entirely as a pit for a bark-bed, without any walk within, or door for entrance, the necessary culture being performed by sliding open the glasses at top, the flues for the fires being formed in the upper part of the back wall, above the surface height of the bark-bed. They may, however, be formed in the manner of the Houses.

Succession House.—This should be constructed with erect glasses in front, and sloping sashes at top, with a door for entrance, and an alley or walk next the back wall; or, what is better, continued round the bark-pit. And where joined to the end of the House, it may be di-

vided from it by a sliding glass partition, having a separate furnace and flues, as the young pine plants do not at all times require the same degree of fire-heat as the older pines. The dimensions must vary according to circumstances and the number of plants. See STOVE and GREEN-HOUSE.

HOT-HOUSE PLANTS, such of the tender exotic or other kinds as require this sort of house for their growth, protection, and preservation in this climate. See STOVE PLANTS.

HOT-WALL, a range or extent of brick or stone walling, fronted with glass-work, so as to inclose a space of several feet in width, constructed with internal fire-flues, &c. designed for forcing fruit-trees to early production.

Walls of this nature are mostly ranged lengthways, east and west, to front the full sun; having the south side, or that exposed to the sun, covered by a frame-work of glass, the whole length and height, including a space of but moderate width, as four, five, six, or eight feet, for one row of trees behind, trained in the wall-tree order, and extended from twenty or thirty, to forty, fifty, or a hundred feet in length; or of greater width, as ten, twelve, or fifteen feet, in the forcing-house manner, to admit of a range of trained trees behind, and others of lower growth forward; and, in either having internal flues for fire-heat in the main wall, and continued round along towards the front glass, or sometimes ranged longitudinally along the middle space. Some Hot-walls have likewise the front inclosure of glass-work, of sufficient width to admit of forming an internal pit, from four to five or six feet in width, the length of the erection; in which to make a bark-bed, or sometimes a dung hot-bed, or occasionally dung below, and bark above, to assist, in conjunction with the fire heat of the flues, in warming the internal air.

In either method, a border of good mellow, loamy, or other fertile earth, of proper width, is formed against the main wall, in which to plant the trees. Where there is no bark-bed, the whole bottom space is formed of good earth, having a narrow inclosure of glass, four, five, or six feet, to have only a range of trees next the wall, trained as wall-trees, or espaliers; or sometimes made wider, to have wall-trees behind, trained to the height of the wall, and others trained in lower growth, in the internal space forward, either in the espalier manner, or as small dwarf-standards, or sometimes as horizontal dwarfs. See DWARF TREES.

When these are made of wide dimensions, either to admit of a bark-pit, or to have the whole internal bottom space of earth with trees

against the wall, and others planted forward between these and the glasses, they may properly be considered as forcing-houses.

In proper Hot-walls, as such as have narrow inclosures of glass from four to five or six feet in width, containing only one range of trees, they may be trained towards the wall upon trellis-work, where there is a range of flues immediately next the wall; but where all the flues are ranged forward, the trees may be trained close to the wall. See FORCING FRAME.

In the annexed plate is seen the ground-plan, section, and elevation of an improved wall of this kind, in which fig. 1. is the ground plan, fig. 2. longitudinal section, and fig. 3. transverse section.

HOUND'S-TONGUE. See *CYNOGLOSSUM*.

HUMBLE PLANT. See *MIMOSA*.

HUMULUS, a genus containing a plant of the hardy twining perennial kind.

It belongs to the class and order *Dioecia Pentandria*, and ranks in the natural order *Scabridae*.

The characters are: that in the male the calyx is a five-leaved perianthium: leaflets oblong, concave, blunt: there is no corolla: the stamina have five capillary filaments, very short: anthers oblong: in the female the calyx is an universal involucre, four-parted, sharp: partial four-leaved, ovate, eight-flowered: to each flower a perianthium, one-leaved, ovate, very large, outwardly flat on one side, converging at the base: there is no corolla: the pistillum is a very small germ: styles two, subulate, patulous: stigmas sharp: there is no pericarpium: calyx inclosing the seed at the base: the seed roundish, covered with a coat.

The species is *H. Lupulus*, the Hop.

It has a perennial root: the stems weak and twining, not climbing by tendrils, but ascending a prop, trees or shrubs in a spiral, always with the sun, that is, from right to left, or from east to west by the south: these stems are angular, striated, and rugged, with very minute prickles: the leaves opposite in pairs (or sometimes in threes), the upper ones heart-shaped, the lower three-lobed (or sometimes five-lobed), serrate, dark green above, pale green beneath, on long petioles; which, as well as the leaves themselves, are rugged with minute prickles: the stipules two or four, cordate, bifid at each joint: the flowers greenish yellow; the males on branched peduncles; the females on a distinct plant, peduncled, in pairs, in form of a cone or strobile, composed of ovate, membranaceous scales, tubular from being rolled in at the base, and two-flowered, each containing one (sometimes two) seed, of a brown bay co-

lour, of a globular form a little flattened, surrounded with a sharp rim, and compressed at the tip. It is a native of most parts of Europe, flowering in June.

There are Hop plants, which bear male flowers only, growing in long clusters; and Hop plants which bear female flowers only, produced in roundish, scaly, leafy clusters. The latter is the only sort cultivated, and which the Hop planters distinguish into, Early White, Long White, Oval, and Square Garlic Hops.

Culture. These plants are increased by cuttings of the suckers immediately from the roots within the earth, every part of which will grow, making them six or seven inches long, each having three or four buds or eyes, for emitting shoots. They may be taken from the roots of the plants of any old plantation. Care should be taken to choose good sorts, and such as are good bearers, trimming each set from all parts of the old vine, and any hollow or bad part.

They may also be propagated by layers of the young shoots in summer, cutting off their tops at the time of laying; they will soon root and form sets for next spring.

The plants or sets should be all of a sort, not early, middle, and late kinds planted together, which, by ripening at different times, would occasion great trouble in gathering the produce.

The Early White Hop, which comes first, is a fine Hop, but an indifferent bearer. The Long White Hop comes next, and is a good bearer. The Square Garlic Hop comes latest, but is a plentiful bearer, though a coarser Hop than the others.

The ground for this purpose should be well dug over, and rendered perfectly fine in the mould, as well as smooth and level on the surface.

When the land is thus prepared, having the sets ready, proceed to plant them by line, in straight rows, six or eight feet distant, and the same distance in each row, in the quincunx order. A long line should be provided to reach quite across the ground, on which, at every six or eight feet, a knot or small bit of rag should be tied; then stretching the line, and having a quantity of sharp-pointed sticks, place one down at each of the marks, and at each a hole should be dug a foot and a half wide, or more, and filled up again with the earth and some rotten dung laid on for the purpose, raising it into a sort of hillock, for the reception of the plants, which should be planted four or five in each, by means of a dibble, putting them in within a little of the tops, one in the middle, and the others at equal distances round it, pressing the

mould well round them, and covering them with fine mould as they are finished off.

The proper season for performing this business is in the early spring, as in the latter end of March or beginning of April.

When the plantation has been thus formed, the next care is to keep it clean from weeds, by frequent hoeing. The first operation should be performed in May, choosing dry weather; and as the work proceeds, a little mould should be drawn round about each hill to form a greater body of earth immediately about the plants, continuing the hoeings during the summer, as there shall be occasion.

The plants shoot forth into tolerably strong vines early the same year; so that in May small poles may be placed to each hill for them to run up on, and they will produce a few hops the same year; though some do not pole them at all the first season, which is a better practice, only twist the vine into a bunch in June, at the top of each hill, regardless of any crop, as 'tis apt to weaken the young plants.

In the spring following, in February or March, it is necessary to dress or prune the hops; when the ground must be dug or ploughed, and the earth about the hills of plants be removed from the stocks or roots, clearing it quite away from the tops of the principal roots with an iron picker, for the convenience of pruning close to the head of the stock; then with a sharp knife trim off all the shoots of last year, or the remaining part of them, close to the heads of the stocks or sets; clearing away also all young suckers, and directly trim in the earth around each hill, and cover the stocks with mould two or three inches thick. The same process must be repeated annually.

After this the plants soon shoot forth into vine, or bind; when long poles, about fifteen or twenty feet in length, must be placed for them to run upon. April, or the beginning of May, when the shoots are a foot long, is the proper season for this work: three poles must be set to each hill, around the outside, let deep in to the ground, by making holes for them with an iron crow, so as to place them with their tops inclining a little outward from each other, to keep the plants from entangling, and a space between two of them be left open toward the south, to admit the sun more freely.

When thus poled, they naturally twine themselves about the poles, directing such with the hand as do not readily catch hold of themselves, turning them the way of the sun's apparent motion, tying them loosely with dried rushes or other soft bandages, training two or three vines to each pole; all above that number being plucked up, if the plantation be old; but

if young, wrap them up together in the middle of the hills.

The next work is that of summer-digging, which should be done in the beginning of June. This is digging about the hills, and casting up some fine earth around, and upon each; which is sometimes repeated again the beginning of July, to make all the hills of a proper substance, for the better nourishing of the plants. And after the plants are grown up, where any of them are found under-poled, taller poles must be placed near those that are too short, to receive the vines from them; for, unless they have due length of pole, they will not yield a full crop; and if the vines are very strong and over-top the poles, it is common to strike off the heads of the shoots with a switch, whereby they throw out many lateral branches, well charged with clusters of fruit. In July they blow, and towards the end of August begin to ripen; the signs of which are, the bunches of fruit imparting a strong hop like scent, becoming dry and hard to the touch, and the brownish colour of the seed. They are then fit for gathering, when they should be picked with all possible expedition; for a sudden storm of wind, or great rains, would do considerable damage, by breaking down the vines, and discolouring the Hops. This work must be performed in dry weather, if possible. And a certain number of hills in a square space is to be cleared at a time, generally about eleven, and a large square bin, or wooden frame, eight feet long by three broad, having a cloth within, hanging on tenter-hooks, is to be placed in the centre to receive the Hops; then proceeding by cutting up the vines of the above number of hills, and pulling up the poles, using a wooden instrument like a lever, having at one end a forked piece of iron, with teeth on the inside, which will readily raise them out of the ground; then laying two poles at a time across the bin, two or three persons standing on each side, in order to pick the Hops into it, picking them very clean without leaves and stalks; and as the bin is filled, it must be emptied two or three times a day, as there may be occasion, into a Hop-bag, and carried to the kiln to dry. This is the same as a malt-kiln, being covered with a hair cloth, on which to spread the Hops, which should be spread ten or twelve inches thick: a charcoal heat is commonly used; continuing an even steady fire, not fierce, but rather increased by degrees. In about nine hours the Hops should be turned, and in two or three hours more they may be taken off: by that time the brittleness of their stalks, and easy falling off of the leaves, determine them to be sufficiently dried.

They are then to be carried into dry upper rooms, to lie three or four weeks to toughen; otherwise they would become powder in the operation of bagging.

This is performed in large bags, made of about four ells and a half of ell-wide coarse cloth; about a handful of Hops being first tied into each corner at bottom, to serve as handles; the bag is then fastened to a hole of due width in the floor, made for that purpose, having a hoop fastened to the mouth of the bag, on which it rests on the edges of the hole; then a person puts the Hops into the bag, while another is continually treading them down, till the bag is full; the bag is then unfastened from the hoop, and let down; and the mouth closed up, tying a handful of Hops also in each corner, as in the bottom part; they are then ready for market, &c.

A plantation of Hops will continue in good bearing several years, provided the ground is properly manured; for which the proper manure is well rotted dung, or a compost of dung and earth, prepared some time for that purpose; and of either, from about twenty to forty cart-loads are the common allowance for an acre; the former quantity is generally allowed when dung is scarce, laying it only along the hills of plants to be dug in winter or spring; but the best way is to allow about forty loads, and dig or plough it in any time from October till March; as such a dressing need not be repeated but once in two or three years, or thereabouts.

After the ground is cleared every year from the Hops, care should be taken of the poles, which, if they could be laid under any covered place, it would greatly preserve them; but for want of such convenience, they are usually placed in parcels upright in the open air, first fixing three or six poles firmly in the ground, in a triangular manner, wide at bottom, and tied together at top; then setting as many of the rest of the poles about them as may seem convenient. And as the poles decay, new ones must be provided. These may be of any wood; but the sorts commonly used are ash, birch, maple, sycamore, willow, poplar, and chesnut. It requires about three thousand poles to an acre, allowing three to each hill.

These plants are seldom cultivated in the garden, but as climbers for the purpose of affording ornament and variety, as they readily twist round any support to the height of twenty feet or more.

HURA, a genus furnishing a plant of the exotic tree kind, for the stove.

It belongs to the class and order *Monoecia*

Monadelphia, and ranks in the natural order of *Tricocceæ*.

The characters are: that in the male flowers the calyx is an ament from the divarication of the branches, oblong, drooping, covered with sessile, spreading florets: scales oblong: perianthium within each scale of the ament, cylindric, two-leaved, truncate, very short: there is no corolla: the stamina have a cylindric filament, a little longer than the calyx, peltate at the tip, rigid, below the tip twice or thrice verticelled with tubercles: anthers two, immersed in each tubercle, oval, bifid: female flower in the same plant: the calyx is a one-leaved perianthium, cylindric, furrowed, truncate, quite entire, closely surrounding the germ: there is no corolla: the pistillum is a roundish germ, within the calyx: style cylindric, long: stigma large, funnel-shaped, plano-convex, coloured, twelve-cleft, blunt, equal: the pericarpium woody, orbiculate, or globular-flattened, torose, with twelve furrows, twelve-celled: cells dissilient, crescent-shaped, with an elastic dagger point at the end: the seeds solitary, compressed, sub-orbiculate, and large.

The species is *H. crepitans*, Sand Box Tree.

It rises with a soft woody stem to the height of twenty-four feet, dividing into many branches, which abound with a milky juice, and have scars on their bark, where the leaves have fallen off. The branches are garnished with heart-shaped leaves; those which are biggest are eleven inches long, and nine inches broad in the middle, indented on their edges, having a prominent midrib, with several transverse veins from that to the sides, which are alternate; these stand upon long slender footstalks: the male flowers come out from between the leaves, upon peduncles which are three inches long; they are formed into a close spike, or catkin, forming a column, lying over each other like the scales of fish. The female flowers are solitary, and very near the ament: the leaves are alternate, and accompanied by caducous stipules; the petiole is glandular above; the younger leaves are involuted. The fruit is curious in its structure; and the tree, when it grows well, spreading and shady. It is a native of the Spanish West Indies.

Culture.—This plant is increased by sowing the seeds procured from abroad, in the early spring, in pots filled with rich earth, plunging them in a mild hot-bed of bark. When the plants have attained a few inches growth, they should be removed into separate pots of a small size, watering them, and replunging them in the bark bed of the stove, where they must be constantly kept, being occasionally removed

into larger pots, and sparingly watered in the winter season.

When thus managed, they will attain twelve or fifteen feet in growth in this climate, and often afford flowers.

They afford ornament and variety in the stove collections.

HYACINTHUS, a genus containing plants of the bulbous-rooted flowering perennial kind.

It belongs to the class and order *Hexandria Monogynia*, and ranks in the natural order of *Liliaceae*.

The characters are: that there is no calyx: the corolla is monopetalous, campanulate: border six-cleft, reflex; nectary, three honeyed pores, at the tip of the germ: the stamina have six awl-shaped filaments, shorter: anthers converging: the pistillum is a superior germ, round-three-cornered, three-furrowed: style simple, shorter than the corolla: stigma obtuse: the pericarpium is a roundish capsule, three-sided, three-celled, three-valved: the seeds in pairs (generally), roundish.

The species cultivated are: 1. *H. orientalis*, Eastern or Garden Hyacinth; 2. *H. non scriptus*, Common Hyacinth, or Hare-bells; 3. *H. cernuus*, Bending Hyacinth; 4. *H. serotinus*, Late-flowering Hyacinth; 5. *H. amethystinus*, Amethyst-coloured Hyacinth; 6. *H. muscari*, Musk Hyacinth; 7. *H. monstrosus*, Feathered Hyacinth; 8. *H. comosus*, Purple Grape Hyacinth; 9. *H. botryoides*, Blue Grape Hyacinth; 10. *H. racemosus*, Clustered Grape Hyacinth.

The first has a large coated bulb, viscid, and of a sweetish taste, from the bottom of which spring the roots, which are long round fibres, of a middling thickness; from the middle of it a single naked stem or scape; and from the top six, seven, or more leaves: the leaves are broadish, keeled, pale green at bottom, but of a darker green towards the end: the scape is a long span in height, smooth, roundish, pale green below, but tinged with brown towards the top: from the middle of this to the top come out the flowers one above another, not pointing the same way, as in the Harebell, but standing on different sides of the stalk; three, four, or five, to twelve or more in number, each nodding on pedicels, half an inch in length, usually of a very dark green colour, and having a pair of small bractes at the base: the corolla is near an inch in length, almost cylindrical except at the base, where it swells or bellies out, and at the top the segments are turned back a little: these flowers have a very sweet smell, and are much valued for the variety of their colours, as pure white, white tinged with blue, all shades of blue from these to the dark

violet, and all shades of red purple from the faint blush to the deep red; they are also sometimes yellow. It is a native of the Levant; flowering in March and April.

There are varieties with single white flowers, with double white flowers, with red single and double flowers, with flesh-coloured single and double flowers, with blue single and double flowers, with purple-blue single and double flowers, with flesh-coloured single and double flowers, with yellow flowers, with double white flowers, with red eyes or middles, with double white with purple eyes, with double white with flesh-coloured eyes, with double white with yellow eyes, with double agate-blue, with double and single porcelain-blue, with double and single violet-coloured flowers.

There are also many intermediate varieties which have been obtained from seed, and by which many new ones of the above principal sorts are annually gained; each variety being distinguished either by the name of the place where first raised, the person who raised them, or that of illustrious personages, as the greatest kings, the bravest generals, the most famous poets, the celebrated ancient historians, and gods and goddesses.

It is this species and varieties that are commonly esteemed and cultivated by florists.

The chief properties which distinguish the good Double Hyacinth are, that the stalk be tall, strong, and upright: the flowers or bells sufficiently numerous, each suspended by a short strong peduncle, in a horizontal position; the whole having a compact pyramidal form, with the crown or uppermost flower perfectly erect: the flowers should be large, and well filled with broad bold petals, appearing to the eye rather convex, than flat or hollow: they should extend to about the middle of the scape or stalk: the plain colours should be clear and bright, strong ones being in general preferred to pale colours, and such as are mixed should blend with elegance.

In the second species the root is roundish, about the size of a nutmeg: the scape from six inches to a foot in height, upright, round, smooth, and solid, bowed down when it begins to flower: the leaves are four, six, or sometimes more, only half the length of the scape, and about half an inch broad, keeled, hollow, smooth, shining, grass green, flaccid, bending downwards, ending in an acute point: the flowers are in a long raceme or spike, from eight to twelve, often more, all pointing one way, pedicelled, pendulous, sweet-smelling, blue or violet colour, varying to white and flesh-coloured, six-parted to the very base. It is a native of France.

The third agrees with the first sort in habit

and appearance; but it is smaller, and differs in having the leaves more linear or less lanceolate, and more erect; the raceme is more nodding; the corollas flesh-coloured, not blue, rounder, with the sides of the petals less spreading, flat at the base, not marked with a raised line on the back, and less rolled back (though still reflex) than in that. It is a native of Spain.

The fourth species has an ovate-conical, solid bulb, covered with brown skins: the scape single, a foot high, and smooth: the leaves channelled, sheathing the scape at the base, shorter than the scape, sharp at the end: the flowers in a raceme, all pointing the same way, drooping a little; each on a short peduncle, with an awl-shaped bracte at the base: the corolla is of a dull greenish red colour. When the flowers first appear, they are of a light blue, but fading to a worn out purple colour. It is a native of Spain; flowering here in June.

In the fifth the root is the size of a small olive, covered with a brown skin: the leaves five or six, longer and narrower than in the first sort, striated and keeled, lying mostly on the ground: the scape slender, a long span in height, round, smooth, glaucous, having six or seven flowers at top (sometimes twelve or more), nodding, on pedicels half an inch in length; they are bright blue, smaller than those of the first sort, without any scent. They are smaller and of a deeper blue than the above.

Most of these have white stripes and edges; and they vary to pure white, and a fine pale red colour, with deeper-coloured veins running along the three outer segments. It was formerly known by the name of *Coventry Blue Hyacinth* by gardeners. It is a native of Spain, flowering in April and May.

The sixth species has pretty large, oval, bulbous roots, from which arise several leaves, which are about eight or nine inches long, and half an inch broad; incurved a little on their sides, and end in obtuse points; these embrace each other at their base; out of the middle of these, the stalk which sustains the flowers arises; it is naked below, but the upper parts are garnished with small flowers growing in a spike; these have ovate pitcher-shaped petals, which are reflexed at their brim, and are of an ash-coloured purple, seeming as if faded, but have an agreeable musky scent: the stalks do not rise more than six inches high. Where they are in quantity, they perfume the air to a considerable distance. It is a native of the Levant, flowering in April.

There are varieties with the same coloured flowers on the lower part of the spike, but larger, and more of the purple cast; and those on the up-

per yellow, with a very grateful odour, and with very large yellow flowers.

The seventh has a large bulbous root, from which come out several plain leaves a foot long, and about half an inch broad at their base; they are smooth, and end in obtuse points: the flower-stalks rise near a foot and a half high; are naked at the bottom for about seven or eight inches, above which the panicles of flowers begin, and terminate the stalks: the flowers stand upon peduncles which are more than an inch long, each sustaining three, four, or five flowers, whose petals are cut into slender filaments like hairs; are of a purplish blue colour, and, having neither stamina nor germ, do not produce seeds. It is a native of the south of Europe, flowering in May, after which the stalks and leaves decay to the root, and new ones arise in the spring following.

The eighth species has the root bulb as large as a middling onion, which is ovate, solid, and white, covered with a purplish skin: the leaves five or six, a foot (or eighteen inches) long, and three quarters of an inch broad at the base, diminishing gradually to a blunt point; (linear, channelled, bright green): the flower-stalk rises about a foot (or eighteen inches) in height (round, upright, smooth, glaucous green): the lower half is naked, but the upper part has a loose raceme of flowers, frequently for a foot in length: the lower flowers are further asunder; before they flower they are upright, but while they flower, and afterwards, they stand out horizontally on pedicels half an inch in length; their colour yellowish green, with blue or purple at the end: these are fertile. The upper ones smaller; leaves stand upright, forming a corymb, and are blue or violet, as also their long pedicels. It is a native of the South of Europe, flowering the end of April and beginning of May.

There are varieties, with white and with blue flowers. Mr. Curtis terms it the Two-coloured or Tassel Hyacinth. It is distinguished more by its singularity than beauty.

The ninth has the leaves three lines wide, straight on account of their short petioles: the spike has from twenty to thirty flowers: the teeth of the corolla are white, and the uppermost are small: and the leaves are rolled into a cylinder: the raceme (or spike) an inch long; the flowers nodding, sweet-smelling, scarcely longer than their upper pedicels. It grows naturally in the vineyards in France; and where once planted in a garden, it is not easily rooted out, as the roots multiply greatly.

There are varieties with blue, with white, and with ash-coloured flowers.

The tenth species has a small bulb: the leaves

are keeled, very narrow, a line or little more in breadth, cylindrical, on account of the weakness of their petioles loose and decumbent, rolled round and twisted in a variety of ways: the scape a span high, blue under the flowers, compressed at top, terminated by a close globular spike or raceme of from forty to fifty flowers, of a very dark blue, with a three-cornered white mouth; they are imbricated downwards, have very short peduncles, a sweetish smell, somewhat like new starch, or plums. It is a native of the South of Europe; flowering in April and May. Mr. Curtis terms it Starch Hyacinth.

Culture.—The first sort and varieties are all increased by planting the off-sets from the roots in the manner of other bulbous-rooted perennial plants; and by sowing the seed to produce new varieties.

They succeed best in a light soil, but will prosper in any common earth, particularly in moderate sandy ground, in a dry, open, sunny situation. These bulbs, if planted in strong or very moist land, are apt to rot in winter, or become diseased. Where, therefore, the soil of the flower-borders or beds is of a strong heavy quality, the part designed for Hyacinths should have light materials, such as any light sandy earth, from the surface of some common or other place; drift-sea-sand; or any upper sandy soil, or light earthy compost; and where the soil of the borders, &c. is of a very light, sharp, sandy nature, a portion of light, mellow, loamy earth, and neat's dung, or well rotted dung of old hot-beds, make a fine compost surface mould for the Hyacinth, when mixed and laid on long enough before for the dung to be converted into mould.

The ground should be well wrought over as a preparation for the plants, one spade deep at least, raising the bed or border a little above the general level to avoid moisture; and raking the surface smooth and even.

The florists mostly prepare a compost for their rare kinds of Hyacinths, with light, sandy loam, or any sandy earth from a pasture-field, taking only the top spit, ten or twelve inches deep, adding about one third, from the surface, to one of drift or sea-sand, and the same quantity of rotten neat's dung; mixing the whole in a heap ridge-ways, in some dry sunny exposure, to lie several months, or if a year or more the better.

To the above material, some also add a quantity of rotten leaves of trees, thoroughly rotten tanner's bark, or any perfectly rotten earthy wood, or rotten saw-dust; all of which together greatly improve the composition: but as these are not always readily obtained, the other compost is frequently used with success. With these composts a bed is prepared in the beginning of au-

turn, four feet wide and two deep, a cavity being dug out that width and depth, and filled up entirely with the composition, six inches above the common level, to allow for settling, leaving it a fortnight or a month to settle; when it is ready for the reception of the bulbs.

The curious in these plants never plant the fine sort two years together in the same bed or earth, without some previous renewal, as by planting them every year in a fresh bed, or fresh prepared compost, it greatly improves the size and beauty of the flowers.

The proper season for planting them is either in October, or the beginning of November; as those then planted shoot early in spring, and flower strong at their usual season; but those planted later in autumn, or continued out of ground till January and February, for a later bloom, flower weaker and with inferior beauty; the principal part should always be planted in the autumn.

When any of the common kinds are intended to be planted to adorn the open borders contiguous to the principal walks, or lawns near the habitation, to increase the variety in assemblage with other bulbous-rooted spring flowers, as early Tulips, Narcissuses, Anemones, Ranunculuses, &c. they should be disposed towards the front, more or less, in a varied order, in patches of three roots in each, three or four inches deep; and the patches may be from about one yard to three or four distance, letting them stand to take their chance, without any further care.

In planting the fine double sorts, four or five rows may be planted on each bed lengthways, about nine inches distant in each row, and about four inches deep, either in drills drawn the above depth, by dibble, or by bedding them in; and as soon as they are planted, in either method, the surface of the bed should be raked smooth and even.

The bulbs being thus planted, the choicest sorts should be protected in the beds occasionally during winter, from severe frost. They may be readily protected by a covering of straw, or any kind of dry strawy litter, three or four inches thick; or by arching the beds with hoops or rods, or with moveable arched frames of open work, covered with mats, the coverings being immediately removed when not wanted. The same caution should be continued in the spring.

When the flower-stems are advanced nearly to their full height, it is proper to support them, by placing a small stick, fifteen or eighteen inches long, close to each plant, being careful not to thrust it into the bulb, and to tie the stems neatly to each stick, by which the spikes of flowers will be preserved in an upright position.

When in bloom, the curious sorts may be preserved much longer in beauty, by being screened occasionally from the sun and rain, by a sort of awning or umbrella of mats or canvass; they should however be shaded only from the mid-day sun, from about ten to three or four o'clock, and only from excessive rain, and boisterous winds.

But when the flowers begin to fade, all covering should be entirely removed, that the bulbs and increasing off-sets may derive all possible benefit from the free air, dews, &c.

When the season of flowering is over, the bulbs should be taken up, which in the florists' language is called lifting the roots. The fine sorts should be taken up at this period, to separate off-sets for increase, as well as to benefit the main bulbs, which will always flower stronger than such as are suffered to remain two or more years unremoved.

The proper time for this work is in summer, soon after they have done flowering, when their leaves begin to turn yellow, as then the bulbs have had their full growth for that season, and should by no means remain longer in the ground.

Dry weather should be chosen, and a trowel, or small spade, is proper for lifting them, taking them up one by one, and breaking off the stem within an inch or two of its origin; then laying them in an airy room, out of the mid-day sun, to dry off the gross moisture very gradually, and to ripen the bulbs to a due hardness, when they appear of a purplish tinge; otherwise they are apt to rot.

When the bulbs are properly hardened and ripened, they should be taken up and separated from any off-sets, well cleared from earth, loose skins, and fibres at bottom; then, after exposing them a few hours in the sun, put up in boxes singly, or upon dry shelves out of the sun, to remain till the season for planting them again.

All the off-sets appearing about the main bulbs at the lifting season, are to be carefully separated from them, either as soon as they are taken up, or after the bulbs have lain to ripen, being kept separate, and planted in the early autumn, in beds by themselves, in rows six inches asunder, and two or three deep, where they should remain a year or two; then be taken up at the proper lifting season in summer, and managed as the large blowing roots.

In raising these bulbs from seed, which is practised by the curious, to obtain new varieties, to increase their stock; from the time of sowing, it will be four or five years before the bulbs produce flowers: the seed ripens in the summer,

which may easily be saved, by suffering some of the finest singles and half doubles to stand to ripen it in perfection.

The proper season for sowing it is in the beginning of autumn; when the plants will come up in the spring following. It grows freely in the open ground, in a bed or border of light earth; but when no great quantity is to be sown, it may be put into pots or boxes, which will be convenient to move occasionally to different situations at different seasons. In either method choose rich light earth, making the surface smooth, sowing the seeds evenly, and covering them an inch or an inch and a half deep: if they are sown in pots or boxes, let those be plunged to their rims in a dry place, and in November remove them either under a hot-bed frame to have occasional shelter in winter, or cover them at the approach of hard frost with some light dry litter, using the same precaution as for those sown in beds; but let them be fully exposed in all mild weather.

When they appear in the spring, first with very small leaves, they should be kept very clean from weeds, sifting a little earth over the bed in autumn, and in winter use the same precaution as before. In the second summer, when their leaves begin to decay, take up the young bulbs, to be planted out in nursery-beds, which may be done in August or September, planting them in small drills two inches deep, having the drills three or four inches asunder. In this situation they may stand two years, sifting half an inch of earth over the surface in autumn, and giving occasional coverings in winter: after this they are to be taken up at the usual lifting-season, and managed as the other bulbs, and planted in autumn where they are to flower.

The other species are capable of being increased readily, by planting the off-sets in the same manner as above, which all the sorts produce in great plenty, and which may be taken up every second or third year when the leaves decay, and the off-sets be separated and managed in the manner as the first sorts.

Blowing them in Water Glasses.—These bulbs may be brought to flower in winter and spring, by placing them in root-glasses of water, or in pots, or small boxes of sand, or light, dry, sandy earth, in the early autumn, and placing them in a warm apartment, or in a green- or hot-house; in all of which they will blow very agreeably, earlier or later in the above seasons, according to the time the bulbs are planted and introduced.

The glasses for this purpose are sold at the glass-shops, and many of the principal seed-shops and nurseries, at from five to nine shil-

lings per dozen; they are of the bottle-kind, but with straight upright bodies narrowing a little upward gradually to the tops, where they terminate in wide, concave mouths, to contain each one root or bulb. They should be filled with soft, clear water, up to the necks, and a little way in the concavity of the mouths; one bulb placed in each glass, with the bottom or root part a little in the water, the top upright; and the bottles set either within a room window, which if towards the sun, will be of greater advantage, or placed on a chimney-piece, or shelves of a light room, where a fire is kept, to bring the bulbs forwarder in growth.

They soon put forth strong root-fibres down into the water, and push leaves and flower-buds at top, which advance regularly for flowering in their peculiar manner. The water should be renewed occasionally when it becomes foul or fetid, discharging the old, and immediately filling up the bottles with fresh water, which is all the culture they require. When the stalks and flower-spikes are considerably advanced, a neat small stick should be placed to each, to support it in an upright growth. But to obtain them in bloom at the most early period, some glasses containing the bulbs should be placed in a hot-house or forcing-house, &c.

In the glasses, the bulbs flower in about six, eight, or ten weeks, accordingly as they are placed. They continue three or four weeks in bloom.

By planting some bulbs in pots or neat boxes of light earth or sand in the autumn, and placing them in a dwelling-room, green-house, &c. they will flower at an early season.

But they flower most early, as has been just observed, in a hot-house, or forcing department, under glasses, worked either by fire or bark-bed heat, &c. Some middling small pots should be provided for this use, or small, neat, oblong boxes, six inches deep, filling them half way, or a little more, with dry light earth, or that of a sandy nature, or with sand; planting one, two, or three bulbs in each pot, according to the size; pressing the bottom gently into the earth, and filling up with more earth or sand over the crown of the bulbs; or, in boxes, several may be planted in each, in the same manner. When thus planted, place the pots or boxes in the house, giving moderate waterings with soft water, when the earth appears dry. They will flower in six or eight weeks. When the flowering is past, and the stalks and leaves decayed, the bulbs should be taken up, cleaned and drying them, and they may afterwards be planted in the full ground for the future year, to recover strength, and produce some good offsets.

The sorts generally used for glasses and pots, &c. are principally any varieties of the oriental kind, especially for blowing in water.

In procuring them, care should be taken to choose perfectly sound, firm bulbs, with the root part at bottom, full, plump, and firm.

They are all very beautiful and ornamental plants. The more hardy and common sorts in patches of five or six in the fronts of borders, clumps, and other parts; and the finer double sorts in beds, pots, boxes, and glasses.

HYDRANGÆA, a genus containing plants of the shrubby and flowering perennial kinds.

It belongs to the class and order *Decandria Digynia*, and ranks in the natural order of *Succulentæ*.

The characters are: that the calyx is a one-leaved perianthium, five-toothed, permanent, small: the corolla has five petals, equal, roundish, larger than the calyx: the stamina have ten filaments, longer than the corolla, alternately longer and shorter: anthers roundish, twin: the pistillum is a roundish germ, inferior: styles two, short, distant: stigmas blunt, permanent: the pericarpium is a roundish capsule, twin, two-beaked with the double style, angular, with several nerves, crowned with the calyx, two-celled, with a transverse partition, opening by a hole between the horns: the seeds numerous, angular, acuminate, very small.

The species cultivated are: 1. *H. arborescens*, Shrubby Hydrangea; 2. *H. hortensis*, Garden Hydrangea, or Chinese Guelder Rose.

The first has a spreading woody root, which produces several soft, pithy, woody stems, from three to four feet high; they are four-cornered when young, and have a green bark, but as they grow older they become taper, and have a light-brown bark: the leaves at each joint opposite, three inches long, and two broad near the base, pointed, serrate; they are deep green above, and pale underneath, with many transverse veins; the petioles are about an inch long: the flowers terminating in a cyme: the corolla small, white, having an agreeable odour. It is a native of Virginia, &c. flowering towards the end of July, and in August.

The second species has a fibrous root, much branched, whitish: the stems several, growing together, erect, shrubby, branched, round, with a smooth brown bark: the branches opposite, each pair crossing the others, round, smooth, leafy, green, with dark purple spots, flowering at the top: the leaves are opposite, spreading, and curved backwards, obtusely pointed, entire towards their base, bright green, pale beneath: foot-stalks short and thick, smooth, pale, channelled above: the cymes terminating, the size and

figure of the common Guilder Rose, and like that almost entirely composed of radiated abortive flowers, of a beautiful rose-colour, inodorous, green when young as well as in decay: the flower-stalks are variously subdivided, smooth, sometimes hairy: partial ones of a deep rose-colour, roundish. It is much valued on account of the great profusion of its elegant flowers. It is commonly cultivated in the gardens of China and Japan.

Culture.—The first is increased by slipping or parting the roots in the early autumn, and planting them out where the plants are to grow. It succeeds best in a moist soil, and requires no trouble but being kept free from weeds, by digging the ground about it in the winter. When the stems are destroyed in severe frosts, new ones are put forth in the ensuing spring.

The second sort is easily increased by planting cuttings of the young shoots, in pots of rich loamy earth, in the spring, plunging them in a moderate hot-bed. When they have stricken good root, they should be removed with balls of earth about their roots into separate pots, and be placed in the green-house.

Though this plant is capable of standing the open air in mild winters, in warm dry situations, it does not flower so well as in the green-house. Superfluous plants should therefore only be employed in this way.

These are ornamental plants; the former in the fronts of the clumps and borders, and the latter among green-house collections and other potted plants, where it produces a fine appearance.

HYDRASTIS, a genus affording a hardy perennial plant.

It belongs to the class and order *Polyandria Polygynia*, and ranks in the natural order of *Ranunculaceæ*.

The characters are: that there is no calyx: the corolla has three petals, ovate, regular: the stamina have numerous filaments, linear, compressed, a little shorter than the corolla: anthers compressed, blunt: the pistillum has numerous germs, ovate, collected into an ovate head: styles very short: stigmas broadish, compressed: the pericarpium is a berry, compounded of oblong acini, or granulations: seeds solitary, oblong.

The species is *H. Canadensis*, Canadian Yellow-root.

It has the root composed of thick fleshy tubers, of a deep yellow colour within, but covered by a brown skin, sending out fibres from several parts in the spring: it sends up one or two stalks about nine inches high, at their first appearance of a light green, but afterwards

changing to a purplish colour, and hairy towards the top. Each stalk has one or two leaves, the lower petioled, but the upper embracing; they are six or seven inches in diameter, and are deeply cut into three, four, or five lobes, which are irregularly serrate; they are of a light green in the spring, but change afterwards to a deep green, with some dark spots or marks, and after the flower is decayed turn to a purplish colour. The stalk is terminated by one flower, which is white, and of very short duration, seldom continuing above three or four hours after it is expanded. The fruit is red and succulent. It is a native of Canada, flowering in May and June.

Culture.—This plant may be increased by sowing the seed, as soon as the fruit is well ripened, in pots of pretty strong earth, protecting them from frost during the winter, and in the spring, when the plants appear, setting them in a shady situation till the autumn, when they may be planted where they are to remain.

It succeeds best in a moist shady situation, where it is not disturbed.

These plants serve to afford variety in such situations.

HYMENÆA, a genus containing a plant of the stove exotic kind.

It belongs to the class and order *Decandria Monogynia*, and ranks in the natural order of *Lomentaceæ*.

The characters are: that the calyx is a one-leaved perianthium, coriaceous: tube short, turbinate, compressed, permanent, with an oblique mouth: limb five-parted, almost regular, upright, deciduous: segments ovate, blunt: two opposite flattish, a little broader: two others concave, with one side narrower: the corolla five-petalled, inserted into the neck of the calyx, sub-papilionaceous, with the petals almost equal: banner, the two uppermost petals, obliquely ovate, obtuse, sessile, at the upper concave segment of the calyx: wings, two petals, similar, lateral, a little narrower: keel, the lowest petal, channelled and excavated, approximating to the wings, within the lower hollow segment of the calyx: the stamina have ten distinct filaments, awl-shaped, erect, bent down above the middle, very long, between the keel and the wings, inserted into the neck of the calyx: anthers linear, fixed by the back: the pistillum is a germ, sabre-shaped, compressed, pedicelled: style very long, bristle-shaped, bent down: stigma thickened, obliquely truncate: the pericarpium is a woody legume, very large, ovate-oblong, obtuse, one-celled, filled with farinaceous pulp: the seeds several (four to eight, large), ovate, wrapped up in pollen and fibres.

The species is *H. Courbaril*, Locust Tree.

It is a large spreading tree in its native situation: it has a large stem, covered with a russet bark, which divides into many spreading branches, garnished with smooth stiff leaves, which stand by pairs, their base joining at the foot-stalk, to which they stand oblique, one side being much broader than the other, the two outer sides being rounded, and their inside straight, so that they resemble a pair of sheep-shears; they are pointed at the top, and stand alternately on the stalk: the flowers are produced in loose spikes at the end of the branches, some of the short ligneous foot stalks supporting two, and others three flowers, which are composed of five yellow petals striped with purple, succeeded by thick, fleshy, brown pods, shaped like those of the garden bean. It is a native of the West India islands and America.

Between the principal roots of the tree exudes a fine transparent resin of a yellowish or red colour, which is collected in large lumps, and called gum Anime. It makes the finest varnish known, by being dissolved in the highest rectified spirits of wine.

Culture.—This is propagated by the seeds, which should be sown singly, in pots of a small size, filled with light earth, in the spring, plunging them in the bark hot-bed. When the plants have attained a little growth, they must be removed into the tan bed of the stove, where they must constantly remain, being managed as other tender plants, little water being given in the winter. Though the plants make much progress at first, they are soon at a stand, and only preserved with difficulty.

They afford variety in the stove.

HYOSCYAMUS, a genus comprehending plants of the annual, biennial, and perennial herbaceous and shrubby kinds.

It belongs to the class and order *Pentandria Monogynia*, and ranks in the natural order of *Lurideæ*.

The characters are: that the calyx is a one-leaved tubular perianthium, ventricose at bottom, with a five-cleft sharp mouth, permanent: the corolla one-petalled, funnel-form: tube cylindrical, short: limb from erect, spreading, half-five-cleft: segments obtuse, one broader than the others: the stamina have five awl-shaped filaments, inclining: anthers roundish: the pistillum is a roundish germ: style filiform, the length of the stamens: stigma headed: the pericarpium is an ovate capsule, obtuse, marked with a line on each side, two-celled, two capsules closely approximating, with a lid opening horizontally: receptacles half ovate, fixed to the

partition: the seeds numerous, unequal (irregular).

The species cultivated are: 1. *H. niger*, Black, or Common Henbane; 2. *H. reticulatus*, Egyptian Henbane; 3. *H. albus*, White Henbane; 4. *H. aureus*, Golden-flowered, or Shrubby Henbane; 5. *H. pusillus*, Dwarf Henbane; 6. *H. physaloides*, Purple-flowered Henbane; 7. *H. Scopolia*, Nightshade-leaved Henbane.

The first has long fleshy roots, which strike deep into the ground, and are branched: the bottom leaves are soft, deeply slashed on their edges, and spreading on the ground: the stalks which do not rise till the second spring, have leaves of the same shape, but smaller, and clasping, and are about two feet high; on the upper part are flowers standing on one side in a double row, sitting close to the stalk alternately. Martyn observes, that the whole plant is covered with unctuous foetid hairs: the corolla is yellow, or rather pale yellowish brown, beautifully netted with purple veins, and a dark purple eye or base: the shape is irregular, gradually tapering into the tube, with five prominent ribs on the outside; the upper segment is the largest, the rest gradually diminishing downwards: the upper incisions are shallow, the lowermost extending half way to the base, and much wider than the rest. It is biennial, forming the root and flower-leaves the first, and the stem and fructification the second season; a native of most parts of Europe, flowering in June. The root, herb, and seeds, are said to be poisonous.

There is a variety in which the corolla and anthers are of a pure brimstone colour, without any tinge of purple.

The second species rises with a branching stalk two feet high: the lower leaves are regularly cut on both sides into acute segments, which are opposite, but the upper leaves are entire: the flowers grow at the end of the stalk, in bunches: they are of a worn-out red colour, and shaped like those of the common sort, but their tubes are swollen. Martyn adds, that the whole plant is smooth, resembling the first, but the stem-leaves are ovate, repand, more smooth above; the floral leaves ovate, sessile, entire: the flowers on a very short peduncle: the corolla bell-shaped, red, beautifully netted with dark veins. It is annual, and a native of Egypt, &c. flowering in July.

The third resembles the first in most circumstances, but the leaves are more rounded or obtuse, petioled, sinuate, very soft, bearded with white hairs, as is also the stem: the flowers fewer, the lower ones on longer peduncles, but the upper flowers have very short ones: the calyx is green, five-toothed, and hairy: throat of

the corolla longer than in the first sort: limb revolute, five-cleft, with unequal segments: the capsule clothed with the calyx, membranaceous, knobbed with the protuberant seeds, ovate, ventricose at bottom, marked with a depressed streak on each side: the receptacle fungose, scrobiculate, ovate-oblong, plano-convex, fixed on both sides to the partition: the seeds very numerous, small, compressed a little, incurved or kidney-form, closely scrobiculate, whitish ash-coloured. It is annual, and a native of the south of Europe, flowering in August.

It has the corolla varying with the base dark purple, or green.

The fourth species is a perennial plant (biennial), with weak stalks, which require support: the leaves are roundish, acutely indented on their edges, and on pretty long foot-stalks: the flowers come out at each joint of the stalk; they are large, and of a bright yellow, with a dark purple bottom: the style is much longer than the corolla: the stem is hairy, and about a foot high: the petioles very hairy: the leaves lobed, toothletted: the peduncles at the side of the petioles, erect with the flower, but quite bent down when in fruit: the outer lobe of the corolla is larger than the rest, and the lower sinus is cut beyond the limb, and there the purple stamens with the very long pistil issue and hang down. It is a native of Candia, flowering most part of the summer.

It varies in size and the shade of the colour in the corolla.

The fifth is an annual plant, a hand in height: the stem oblique, brittle, undivided, having long hairs: the lower leaves entire, upper oblong, toothed, alternate, sparingly hairy, on petioles of the same length with themselves: the peduncles short on the outmost stem, each from the axil of two opposite leaves: the calyxes turbinate, ten-angled, almost the length of the corolla, and broader than its tube, spiny at top: the corolla yellow, with a dark throat, divided on the lower side beyond the limb: the stamens declining. It is a native of Persia, flowering in July.

The sixth species has a perennial root: the stems a foot high, simple, erect, round, rough-haired: the leaves alternate, petioled, cordate, lucid-green, veined, rough-haired underneath, the upper ones gradually larger: the flowers in bundles, terminating, peduncled: the calyxes very short, five-toothed, rough-haired: the corollas purplish, funnel-form, upright: the stamens a little shorter than the corolla, converging: the style the same length with the corolla: the stigma capitate, emarginate, whitish. It flowers early in spring, and is a native of Siberia.

The seventh has also a perennial root, transverse, knobbed, thick, irregular, branched, flexuose, the thickness of the human thumb: the stem herbaceous, annual, upright, round, smooth (scarcely more than a foot high, according to some, but even three feet in height, according to others), the thickness of the human finger, trifid and bifid, with dichotomous branches: (the branches only two, according to Linnæus, spreading, and entirely simple; or, subtrichotomous, with a groove running down from the leaves:) the leaves ovate and oblong, the length of the human finger; the lower quite entire; the upper frequently moderately sinuate or repand: according to some, petioled, naked, somewhat wrinkled, spreading; on the stem alternate, solitary; under the forkings in threes, two of which approximate; on the branches alternate, but two together on the same tooth or base, one of which is a little less than the other: but, according to others, subovate or lanceolate, entire, except the lower ones, which in gardens at least are sinuate-toothed in front, veined, wrinkled, decurrent; the lower ones opposite, the rest scattered: the peduncles one-flowered, pendulous from the axils, weak, two inches long: the calyx smooth, five-toothed, permanent, wider than the fruit, and, as it were, inflated (bell-shaped, five-cleft, awnless): the corolla three times the length of the calyx, bell-shaped, slightly five-cleft, blunt, on the outside ferruginous, with a few pale streaks, within yellow, oblong, large, five-toothed, narrowing at the base into a short tube, yellowish purple, deciduous. It is a native of Idria in Friuli, flowering in the middle of April.

Culture.—They are all capable of being raised from seeds, by sowing them in the autumn in the situations where they are to stand. If the seeds be permitted to scatter, they also produce abundance of good plants.

In the fourth or shrubby sort, the seeds should be sown in pots, when perfectly ripened in the autumn, plunging them in a moderate hot-bed during the winter. When the plants have attained some growth in the spring, they should be removed into separate pots, and be replaced in the bed, due shade and water being given. It may also be increased by planting cuttings in a shady border of light earth, in the summer season, and when well rooted removing them into separate pots.

The only culture which the common sorts require is that of being kept clean from weeds, and properly thinned. The second sort succeeds best in a dry warm situation, or when planted in pots, and protected in the winter season. The fourth sort must be placed so as to have protec-

tion from frost in the winter season, and plenty of fresh air in mild weather.

All the sorts, except the second and fourth, may be introduced so as to afford variety in the borders and clumps of pleasure-grounds; but these two may be placed out among other more hardy potted sorts, or in collections of greenhouse plants, with good effect.

HYPERICUM, a genus furnishing plants of the shrubby and under-shrubby, hardy and tender kinds.

It belongs to the class and order *Polyadelphia Polyandria*, and ranks in the natural order of *Rolaceæ*.

The characters are: that the calyx is a five-parted perianthium: segments subovate, concave, permanent: the corolla has five petals, oblong-ovate, obtuse, spreading, wheel-shaped, according to the sun's apparent motion: the stamina have numerous capillary filaments, united at the base in five or three bodies: anthers small: the pistillum is a roundish germ: styles three (sometimes one, two, or five), simple, distant, the length of the stamens: stigmas simple: the pericarpium is a roundish capsule, with the same number of cells as there are styles: the seeds very many and oblong.

The species cultivated are: 1. *H. balearicum*, Warted St. John's-wort; 2. *H. Ascyron*, Great flowered St. Peter's-wort; 3. *H. Androsæmum*, Common Tutsan; 4. *H. Canariense*, Canary St. John's-wort; 5. *H. hircinum*, Stinking Shrubby St. John's-wort; 6. *H. monogynum*, Chinese St. John's-wort.

The first rises with a slender shrubby stalk in this country, about two feet high; but in its native soil it acquires the height of seven or eight feet, sending out several weak branches of a reddish colour, and marked with scars where the leaves have fallen off: the leaves are small, oval, waved on their edges, and having several small protuberances on their under side: they sit close to the branches, half embracing them at the base: the flowers are terminating, large, bright, yellow. It is a native of Majorca.

The second species has a stem a cubit and half high, round, smooth, rufescent: the leaves are pale green, paler underneath, an inch long and half an inch wide, roundish, opposite: the flowers terminating: calyx green: corolla pale yellow, five times as large as in the common sort. It is a native of the Pyrenees.

The third has a perennial, thick, woody root, of a reddish colour, sending out very long fibres: the stems suffruticose or under-shrubby, ancipital two-edged or slightly winged on opposite sides, two feet high and more, branched towards

the top, of a reddish colour, and smooth: branches brachiate or decussated, spreading: the leaves opposite, sessile, ovate, entire, smooth, dark green, glaucous on the under side, netted with numerous projecting veins and nerves, which become through age ferruginous: on the stem they are two inches long, and an inch and half broad at the base; those on the branches are smaller, of different sizes, and some of them approaching to lanceolate: the flowers small for the size of the plant, disposed in a cyme: the peduncles round, smooth, usually two- or three-flowered, but sometimes one-flowered: the fruit an ovate capsule, assuming the appearance of a berry; at first yellowish green, then red or brownish purple, and lastly almost black when ripe. It is a native of the south of Europe.

The fourth species rises with a shrubby stalk six or seven feet high, dividing into branches at top: the leaves are oblong, set by pairs close to the branches, having a strong odour, but less than those of the fifth: the flowers terminating in clusters, very like those of the fifth. It is a native of the Canary islands, flowering from July to September.

The fifth rises with shrubby stalks three feet high, sending out small opposite branches at each joint: the leaves are oblong, ovate, placed by pairs, sessile, and having a rank smell: the flowers are in terminating bunches. It is a native of the south of Europe, flowering from July to September.

There are varieties, one larger, which is the common one: the other smaller.

The sixth has a root composed of many woody fibres, striking deep into the ground: the stems several, shrubby, near two feet high, covered with a purplish bark: the leaves stiff, smooth, about two inches long, and a quarter of an inch broad, opposite, sessile, of a lucid green on their upper surface, and gray underneath, having many transverse veins running from the midrib to the border: the flowers terminating in small clusters, each on a short peduncle. It is a native of China, flowering from March to September.

Culture.—The first and last sorts are more tender than the others, requiring the protection of the greenhouse in winter. They are capable of being increased by layers or cuttings. The former are made in the spring on the young shoots, which, when well rooted in the end of summer, may be taken off and planted out in separate pots. The cuttings of the young shoots may be planted in pots in the summer, and plunged in a hot-bed, and when well rooted, removed into separate pots.

The last species may likewise be increased by planting slips of the roots in the spring, in the same manner.

They may also be raised by sowing the seed in pots, in the spring, and plunging them in a hot-bed just to bring up the plants.

The second and third sorts are readily increased by sowing the seeds in the autumn, in a bed of common earth, or where they are to remain.

They are, however, best raised by slipping the roots, and planting them, at the same time, where the plants are to grow.

The fourth and fifth sorts are easily increased by planting slips from the old roots in the autumn or spring, taken with root fibres to them; or by dividing the roots, and planting them where they are to grow, or in nursery rows.

They may likewise be increased by seeds, sown as in the two former species, removing them in the spring following to where they are to remain.

The two tender sorts afford variety in greenhouse collections, and the other sorts in the borders, clumps, and other parts of pleasure grounds.

HYSSOP. See *HYSSOPUS*.

HYSSOPUS, a genus affording a plant of the low under-shrubby perennial kind.

It belongs to the class and order *Didynamia Gymnospermia*, and ranks in the natural order of *Verticillatae*.

The characters are: that the calyx is a one-leaved perianthium, cylindrical, oblong, striated, acutely five-toothed, permanent: the corolla one-petalled, ringent: the tube cylindrical, slender, the length of the calyx: throat inclined: upper lip straight, flat, short, roundish, emarginate: lower lip trifid: lateral segments shorter, blunt, the middle one cernate, obcordate, acute, with distant lobes: the stamina have four upright filaments, longer than the corolla, distant: the two upper ones shorter, but the two longer nearer to the lower lip: anthers simple: the pistillum is a four-parted germ: style filiform, under the upper lip, and of the same length: stigma bifid: there is no pericarpium: calyx fostering the seeds: the seeds four, subovate.

The species cultivated is: *H. officinalis*, Common Hyssop.

It has a woody, hard abiding root, the thickness of a finger: the stems very numerous, from a foot to eighteen inches high, shrubby, straight, not much branched; whilst tender square, but becoming round as they grow woody: the leaves numerous, narrow, smooth, entire, like those of Lavender, but much shorter, acute, dotted: whorls of flowers from the bosoms of the leaves, on two many flowered peduncles, shorter than the leaf, directed one way, and continued into a spike. It is a native of the South of Europe, flowering in July and August.

There are several varieties, blue-flowered, white-flowered, red-flowered, long-spiked, with deep blue flowers, curled-leaved, striped-leaved.

Culture.—This plant may be increased by seed, slips, and cuttings.

The seed should be sown in a bed or border of light earth in the spring, and raked in; and when the plants are come up, thin them if too close, and when about three or four inches high, plant them out where they are to remain. When it is designed to form an edging of them, the seed may be sown at once where the plants are to remain, in small drills, and covered half an inch deep.

In the latter methods, a quantity of the robust side-shoots should be slipped or cut off, planting them in a shady border five or six inches apart; giving water as soon as planted, and repeating it occasionally. They will soon strike root, and in autumn may be planted out where they are to stand.

The common blue-flowered kind is the sort chiefly used, which is generally cultivated, sometimes in close rows, by way of edgings to beds or borders, clipping them annually to keep them regular, and within due compass; and sometimes disposed in beds, &c. in rows fifteen or eighteen inches asunder, and the same distance between the plants in each row. The young leafy shoots and flower-spikes are the parts proper for use, and may be cut any time when wanted. The flower-stalks should be cut down for use in the summer, and tied in bunches.

All the varieties may also be employed to adorn the borders, and other parts of the pleasure-ground, disposing them here and there singly to form bushy plants.

END OF THE FIRST VOLUME.

